

Mississippi's Nonpoint Source Management Program



2012 Annual Report



MISSISSIPPI DEPARTMENT OF
ENVIRONMENTAL QUALITY

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Mississippi's 2012 Nonpoint Source Program Annual Report

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Executive Summary

Nonpoint Source (NPS) Pollution, also known as polluted runoff, has an adverse impact on the State's water resources. Unlike pollutants from point sources that enter the environment from well-defined discharge points, pollutants from nonpoint sources find their way to surface and ground waters via rainwater runoff or percolation. The polluted runoff can contain sediment, nutrients, bacteria, or toxic materials. Runoff from the seven major land-use categories listed below potentially impacts the State's water bodies. These categories consist of agriculture, forestry, mining, construction activities, urban runoff, hydrologic modifications, and land-disposal activities. Polluted runoff is a significant cause of water-quality problems in Mississippi. The NPS Pollution Control Program seeks to reduce or eliminate polluted runoff that degrades water bodies in Mississippi.

The State's NPS Management Plan incorporates a strategy for the management and abatement of NPS pollution and relies on statewide and targeted watershed approaches. These approaches are implemented through both regulatory and non-regulatory programs on the federal, state, and local levels. Some of the activities regulated by the State include: construction, stormwater, mining, and hydrologic modifications. The strategies for the management of these activities are to continue developing and implementing educational programs and to continue issuing permits and maintaining compliance and enforcement activities. The implementation of program activities for land-use categories that are not regulated will rely primarily on the voluntary cooperation of stakeholders and will be supported financially through federal assistance programs such as Section 319 and other state resources. The strategies for addressing NPS pollution on a statewide level include education/outreach, assessment and monitoring, use of Best Management Practice (BMP) and nutrient reduction demonstrations, BMP compliance, technology transfer, consensus building, and partnering.

The NPS Management Program also implements a strategy that targets priority watersheds. Prioritization of these watersheds is done by multi-agency teams in the Basin Management Approach (BMA). Within priority watersheds, activities will be implemented to address parameters of concern that appear on the State's 303(d) list. The State's NPS Program also incorporates the *Coastal NPS Program Strategy*, the recently developed *Mississippi Delta Nutrient Reduction Strategy*, *Basin wide Approach Strategy*, and the State's strategy for the development and implementation of NPS Total Maximum Daily Loads (TMDLs).

The NPS Program continues to be implemented in cooperation with several agencies, organizations, and groups at all levels of government and in the private sector. A great focus is given to activities that promote consensus building and partnering to increase the overall effectiveness of the State's NPS Program. One key partnership to increase this overall effectiveness is with the USDA Natural Resources Conservation Service (NRCS). MDEQ and NRCS have recently signed a three-year \$600K per year memorandum of agreement (MOA). The MOA provides for Section 319 funds to be used for assessment and monitoring of National Water Quality Initiative (NWQI) sites where the NRCS has or will implement various conservation practices such as cover crops, filter strips, and terraces.

MDEQ's program strategy will be implemented to meet the long-term goals of the program. The long-term goals will, in turn, be achieved by implementing five-year action plans. These plans will be modified as more data and new issues are identified under the BMA.

This report relates several accomplishments during calendar year 2012 that directly relate to and support the long-term and short-term action strategies identified in the State's NPS Management Program. These accomplishments include characterization, assessment/monitoring, and protection/restoration of impeded

water bodies. Of course, education and outreach activities are inherent to each protection/restoration project so as to gain local stakeholder support and involvement.

Characterization, Assessment/Monitoring. In addition to the partnership mentioned above with the NRCS, MDEQ is proud of its partnership with other governmental and private entities for improving water quality in Mississippi. One partnership involved Georgia Pacific, US EPA Region 4, and the Louisiana Department of Environmental Quality to develop water quality models for the characterization of the Pearl River. A complete data set for model development was accomplished for a major portion of the Pearl River between the Ross Barnett Reservoir and Walkaih Bluff in south Mississippi.

Major assessment and monitoring accomplishments include the further development, refinement, and use of the *Mississippi Benthic Index of Stream Quality (M-BISQ)*. This *Index of Biological Integrity (IBI)* is used to assess all wadeable, non-tidal streams in Mississippi with the exception of those located in the Mississippi Alluvial Plain (aka The Mississippi Delta). Monitoring within the Mississippi Delta has been occurring since 2002 when MDEQ began collecting biological community, physical, chemical, and habitat data on the Delta's wadeable streams. Both of these major assessment/monitoring efforts have greatly increased the number of biological assessments conducted on State waters.

Protection/Restoration. In addition to the above activities, there continues to be much progress in the protection and restoration efforts of specific watershed projects. Six projects are showcased in this report and include: 1) Porter Nutrient Reduction Project; 2) Harris Bayou Nutrient Reduction Project; 3) Rotten Bayou; 4) Ross Barnett Reservoir; 5) North Tippah Watershed and; 6) Dead Tiger/Orphan Creek Watershed.

Both **Porter and Harris Nutrient Reduction Projects** are in the Mississippi Delta and are in watersheds comprised mainly of productive agricultural lands, each having about 80 % of their watershed consisting of these types of lands. Naturally, there are much nutrient-laden sediments that need to be reduced and prevented from reaching waters further downstream. So, the main objectives of these projects are to determine what reductions are achievable using Best Management Practices (BMPs) and the cost to implement these practices. Both of these projects serve as noteworthy examples of leveraging resources in a collaborative effort within a multi-agency task force that form the Mississippi River Basin Initiative (MRBI). As data are beginning to be compiled as these projects near completion, initial findings indicate reductions of over 4,600 lbs/yr of Phosphorous, 9,400 lbs/yr of Nitrogen and 4,300 tons/yr of sediment in Mississippi waters.

Rotten Bayou is a Mississippi coastal watershed containing 22,246 acres and is a tributary to St. Louis Bay. Here, a *Coastal Nutrient Reduction Plan* is being implemented. Nutrient TMDLs have been developed for this watershed and will be used for the load-reduction targets in the watershed implementation plan. Tributaries of St. Louis Bay, including Rotten Bayou, have a TMDL for organic enrichment, low DO, and nutrients. MDEQ is leveraging with nine different federal, state, local government, and non-profit organizations to implement the *Coastal Nutrient Reduction Strategy* that addresses livestock, forestry, urban stormwater, and atmospheric deposition.

Ross Barnett Reservoir is a vital resource to central Mississippi. It is the largest source of drinking water in the State and it receives more than 2.5 million visitors annually and many consider it to be the premier recreational water body in Mississippi. EPA has designated this area as a priority watershed. The MDEQ and the Pearl River Valley Water Supply District (PRVWSD), along with other various resource agencies, have been working towards finalizing plans to protect and restore water quality within the Ross Barnett Reservoir Watershed. This initiative, which is known as *Rezonate*, focuses on six priority issues in the watershed and includes reduction and control of: 1) watershed erosion/sedimentation; 2) pathogens; 3) litter/trash in the reservoir and around the shoreline; 4) nutrients/organic enrichment; 5) invasive

species and; 6) pesticides. As part of the protection and restoration initiative, the *Comprehensive Watershed Protection and Restoration Plan* were developed using EPA's *Nine Key Elements of Watershed Protection* to identify potential pollutant sources in the watershed. Recently, MDEQ and the PRVWSD entered into a memorandum of agreement for professional services that will include the implementation of a minimum of three BMP demonstration-site locations to reduce sediment and peak-storm, water-flow loading into the watershed. The BMP demonstration sites will provide effective education and outreach to numerous targeted audiences within the State.

North Tippah Watershed, a tributary of the Tippah River, flows 220 miles through portions of six counties in northwestern Mississippi and is a NWQI priority watershed. Soils in the watershed are very erosive with gully erosion occurring on sloping cropland and pastureland. North Tippah Creek is listed as impaired for fish and wildlife support due to its biological conditions. The purpose of this project is primarily to inform and educate the public about the things they can do to improve water quality. As a part of this project, MDEQ will work with multiple agencies and stakeholders to develop a Watershed Implementation Team and a Watershed Implementation Plan. MDEQ has partnered with USGS to develop a monitoring plan to characterize stream conditions after NWQI best management practices have been installed.

Dead Tiger/Orphan Creek Watershed is an impaired system about 25,000 acres in size and located in Hancock County in South Mississippi. It mostly consists of timberland (54%), pastureland (44%), and wetlands, urban, and other lands (2%). MDEQ is partnering with several federal, state, and local agencies to improve water quality through the installation of several BMPs. To date, 43 BMPs have been installed that improve water quality on 533 acres. BMP installation has saved a total of 4,881 tons of sediment per year.

Education and Outreach. Education and outreach activities are inherent to each of MDEQ's protection and restoration projects that have been selected from a list of priority watersheds. These activities become a part of the watershed implementation plan for that project. For example, *Adopt-A-Stream* is a program that includes water-education workshops on streams themselves. Streams having protection/restoration projects are given priority for locating and conducting these workshops. Similarly, other education/outreach activities are treated in the same way as much as possible. There are some activities that are generic and have statewide applicability. Activities in addition to *Adopt-A-Stream* described in this report include: 1) *Blueways*; 2) *WaterFest Event on the Ross Barnett Reservoir*; 3) *Watershed Harmony Musical Puppet Theater*; 4) *The Watershed and Me A-Z Book*; 5) *Envirothon Competition*; 6) *Scenic Communities*; 7) *Make-A-Splash*; 8) *Storm Drain Marking Program*; 9) *Enviroscape and Groundwater Models*; 10) *Rain Barrel Demonstration Project*; 11) *Mississippi and Yazoo River Environmental Tours and*; 12) *Environmental Teacher Workshops and Student Environmental Camps*.

NPS – Related Programs and Videos and Manuals. This report also describes several other noteworthy programs and initiatives that influence water quality within the State. It also lists some videos and manuals that MDEQ has produced and/or sponsored that go a long way in educating both professionals and the general public about NPS pollution and prevention.

What is Nonpoint Source Pollution?

Nonpoint source (NPS) pollution, also known as polluted runoff, has an adverse impact on the State's water resources (see www.epa.gov/owow/nps/whatis.html). Unlike pollutants from point sources that enter the environment from well defined discharge points, pollutants from nonpoint sources find their way to surface and ground waters via rainwater runoff or percolation. The polluted runoff can contain sediment, nutrients, bacteria, or toxic materials. This runoff comes from seven major land-use categories and can potentially impact the State's water bodies. These seven categories are: agriculture, forestry, mining, construction activities, urban runoff, hydrologic modifications, and land-disposal activities. Polluted runoff is a significant cause of water-quality problems in Mississippi. The Nonpoint Source Pollution Control Program seeks to reduce or eliminate polluted runoff that degrades water bodies in Mississippi.

Mississippians enjoy a rich heritage of natural resources. From headwater streams to the Gulf of Mexico, Mississippi's land has been blessed. The charge given to the MDEQ is to conserve the environment while allowing economic development to occur in concert with good environmental practices.

The Mission of the NPS Pollution Control Program in Mississippi is to conserve and improve state waters for man's use and the sustainment and propagation of wildlife and aquatic life, through focused research, responsible regulation, widespread education, and cooperation with other agencies and the public."



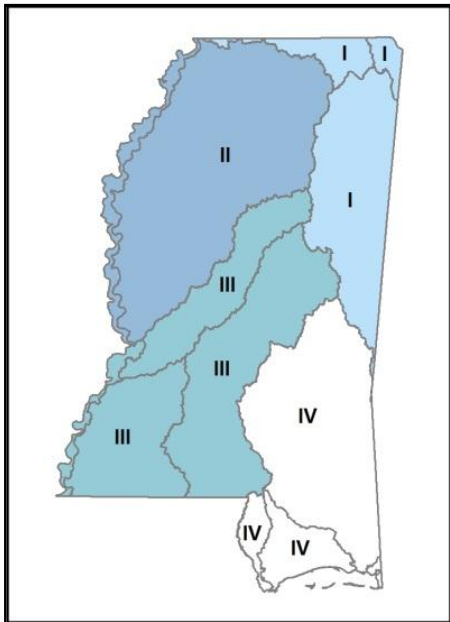
History of NPS Program

History

The 1987 Amendments to the Clean Water Act (CWA) established a national policy that programs be developed to control nonpoint sources of pollution. Congress inserted Section (§) 319 in order to establish a national program to address nonpoint source pollution. It authorized the EPA to issue grants to states and, in order for the states to receive these grants, required the states to assess NPS pollution problems and causes within the State, and to implement a management program to control NPS pollution. Every few years, the states must document their efforts and results in assessing pollution problems and implementing their management programs. A NPS assessment document and a management plan was developed and approved by the Environmental Protection Agency and Mississippi's NPS Management Program began in August, 1989. To date, MDEQ has successfully secured 23 annual grants from the EPA to run its NPS program.

The NPS Program was originally established to provide education and outreach, demonstrate the effectiveness of Best Management Practices (BMPs), investigate the ability of new practices and technologies to reduce NPS pollution, and to assess NPS sources and impacts to waters of the State. In 1999, the NPS Program began to change its focus as the Total Maximum Daily Load (TMDL) issue gained national attention. Questions were raised at both the state and the federal level as to how to address any NPS pollution reductions that might be required in a TMDL. MDEQ answered the question by developing the Basin Management Approach (BMA).

Moving into the future...



The mission of the BMA is to foster stewardship of Mississippi's water resources through collaborative watershed planning, education, protection, and restoration initiatives. To accomplish this, nine of Mississippi's major river basins have been organized into four basin groups (see map inset). Each basin group has a basin team comprised of state and federal agencies and local organizations. This team provides the opportunity for multiple levels of government and local stakeholders to coordinate their efforts. Together, basin team members help assess water quality, determine causes and sources of problems, and prioritize watersheds for water-quality restoration and protection activities. The BMA also encourages and provides the opportunity for basin-team members to pool both technical and financial resources to address priority watersheds. More information on Mississippi's BMA and the NPS Program can be found on MDEQ's website: <http://www.deq.state.ms.us>. Information on the long-term goals of the NPS Program can be found in the quick-links section of the NPS home page on the MDEQ website (See NPS Related Links).

Highlights of the Year

Assessment & Monitoring/ TMDL Activities

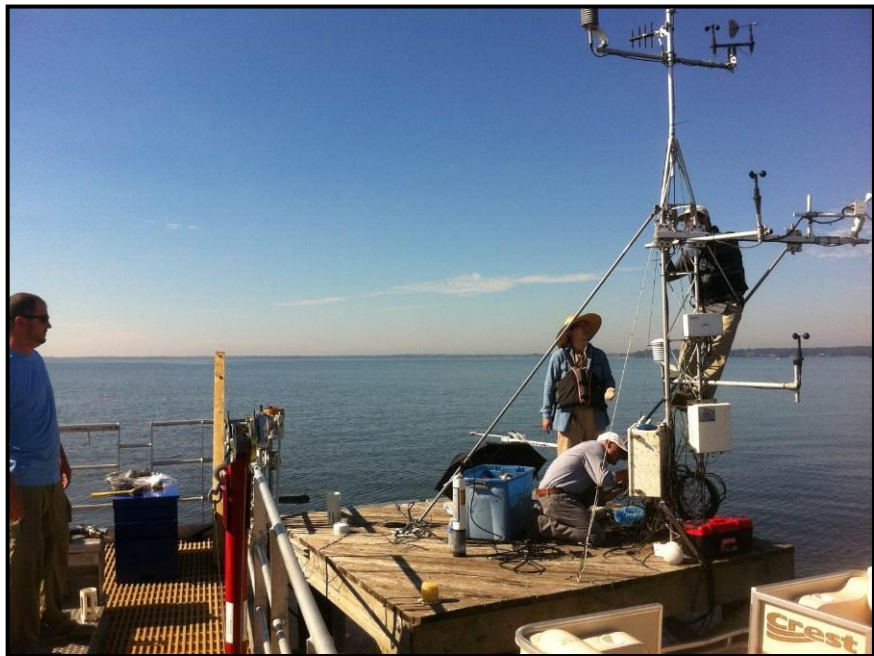
Total Maximum Daily Load and Modeling Section

The Total Maximum Daily Load (TMDL) is a calculation of the greatest amount of any single pollutant that can assimilate in surface waters while continuing to meet water quality standards. The TMDL also determines how much of the pollutant come from point sources, such as industry and communities, or nonpoint sources, such as storm-water runoff from urban areas or agriculture.

Water bodies that do not meet water-quality standards are identified as "impaired" for the particular pollutants of concern. Under Section 303(d) of the Clean Water Act (CWA), states are required to develop a list of impaired waters needing TMDLs. MDEQ, biennially, creates this 303(d) List of Impaired Waters. MDEQ's 2012 list was adopted by the Mississippi Commission on Environmental Quality on June 28, 2012. In addition, MDEQ completed 16 TMDLs between July 2011 and June 2012.

Partnerships

MDEQ TMDL Staff joined in joint partnerships with other governmental and private entities for improving and maintaining water quality in the State of Mississippi. One partnership involved Georgia Pacific, US EPA Region 4, and the Louisiana Department of Environmental Quality to develop water quality models of the Pearl River. In June, 2006, US EPA Region 4 and MDEQ jointly monitored the Pearl River at several stations in Jackson, Mississippi downstream of the Ross Barnett Reservoir to gather stream data to create a water quality model for determining the waste load allocation (WLA) for the Jackson, Mississippi Savannah Street public owned treatment works (POTW). This effort was successful in generating a complete data set for model development in this segment. The WLA as well



as two TMDLs were created based on this dataset. This successful monitoring effort and computer model development generated the idea to build a series of models that link the segments of the Pearl River from the Ross Barnett Reservoir to the water diversion control structure at Walkaih Bluff in south Mississippi. MDEQ, in cooperation with EPA, Georgia Pacific, and Louisiana DEQ (LDEQ) is creating a series of

linked water quality models of the Pearl River Watershed. This summer, the Copiah County Segment was monitored by MDEQ and EPA. LDEQ monitored the Pearl River County segment. Georgia Pacific monitored the segment in Lawrence County in 2011. Over the next 2 to 3 years, these monitoring efforts will be used to generate the information needed for a comprehensive computer model of the Pearl River. Another joint partnership in which the TMDL staff are involved is with Jackson State University's (JSU) Earth Sciences program and Pearl River Valley Water Management District (PRVWMD) to operate a meteorology and water quality monitoring station on the Ross Barnett Reservoir as part of the ongoing work that the Surface Water Division is performing at the Reservoir. JSU and the PRVWMD initially installed the weather station platform as part of a NOAA grant to study the weather impact on the shoreline. MDEQ TMDL staff recently installed a long-term water quality monitoring instrument which will work with the other monitoring equipment already present to provide information on water quality such as pH levels, chlorophyll, dissolved oxygen concentrations, and temperature. These measurements, as well as the weather information from the platform, will provide detailed information for future water related models of the reservoir and the Pearl River. This partnership with JSU and PRVD leverages the combined resources of all 3 partners.

Modeling Permit Limits

The TMDL section is working with national pollutant discharge elimination system (NPDES) Permitted facilities to help with upcoming nutrient criteria, existing nutrient TMDLs, and new oxygen permit limits. These "life changing" limits potentially strain the existing capacity for treatment at many small towns in Mississippi. The TMDL section is working with all of these communities to improve the existing computer models through new survey methods and more intensive monitoring and research; these actions will ensure accuracy in the development of water quality based limits for these facilities.

Mississippi Benthic Index of Stream Quality

In 2001, MDEQ developed the *Mississippi Benthic Index of Stream Quality, Development and Application of the Mississippi Benthic Index of Stream Quality (M-BISQ)* (MDEQ 2003b). This *Index of Biological Integrity (IBI)* is used to assess all Wadeable, non-tidal streams in Mississippi with the exception of those located in the Mississippi Alluvial Plain. Monitoring efforts completed have greatly increased the number of biological assessments conducted on State waters. The M-BISQ sampling program and the established sampling and analytical methodology contained therein now serves as the foundation for routine biological monitoring in MDEQ's statewide *Status and Trends Ambient Monitoring Network*. The M-BISQ was originally developed using biological and environmental data collected from 463 stream locations. Since 2001, almost 1,300 biological samples have been collected from 926 sites. It is common practice to re-calibrate IBIs every 3-5 years to ensure that the index continues to accurately reflect stream health. As such, in 2008, the M-BISQ was recalibrated using data that were collected since the original development of the index in 2003. These additional data were used to both test the performance of the original *M-BISQ* and to recalibrate the index. Over the past several years, MDEQ has been targeting Wadeable streams in blackwater systems. Using these data, MDEQ plans to re-calibrate the M-BISQ to test for the applicability of a separate site class for blackwater systems. If successful, this will increase the sensitivity of the index. As part of MDEQ's routine monitoring program, about 100 samples are scheduled for collection annually.

Mississippi Alluvial Plain Monitoring

In 2002, MDEQ began collecting biological community, physical, chemical, and habitat data on wadeable streams in the Mississippi Alluvial Plain, commonly referred to as the Mississippi Delta. These data, along with historical monitoring in the Mississippi Alluvial Plain were used to develop a preliminary index of biological integrity for the Mississippi Delta. In addition, the data collected are also being used to evaluate the dissolved oxygen criteria in the Delta as well as support nutrient criteria development. With each new set of data collected annually during September – October, the preliminary index will be refined and when finalized, biological monitoring in the Mississippi Delta will be incorporated into MDEQ's *Ambient Monitoring Program*. Since monitoring was initiated in 2002, a total of 96 sites have been monitored. Over the last year, MDEQ has acquired Light Detection and Ranging (LIDAR) data for the Mississippi Alluvial Plain and has used that data to establish drainage areas for each of the monitoring locations. These drainage areas were used to perform land use analyses. These analyses were used to help reform the refinement of the preliminary index, which is now in draft and under review by MDEQ. The effort to develop an index of biological integrity for the Mississippi Alluvial Plain is an ongoing effort with the USGS. The current index should be available for external review in 2013.

Geographic Information Systems (GIS) and Mapping of NPS Projects

GIS remains an important tool in NPS watershed project planning, monitoring, data delivery, and budget tracking. The NPS Branch uses many GIS tools and available data to accomplish its goals, but this section will highlight three applications: 1) The Mississippi Watershed Characterization and Ranking Tool (MWCRT); 2) The Mississippi Water Quality Data Compendium; and 3) The NPS Watershed Resource Management System (WRMS). In support of these tools, the NPS program maintains a geodatabase of locational information for all current and historical Best Management Practice (BMP) installations and also stores information regarding assessment and monitoring of NPS projects by the MDEQ and its partners.

MWCRT

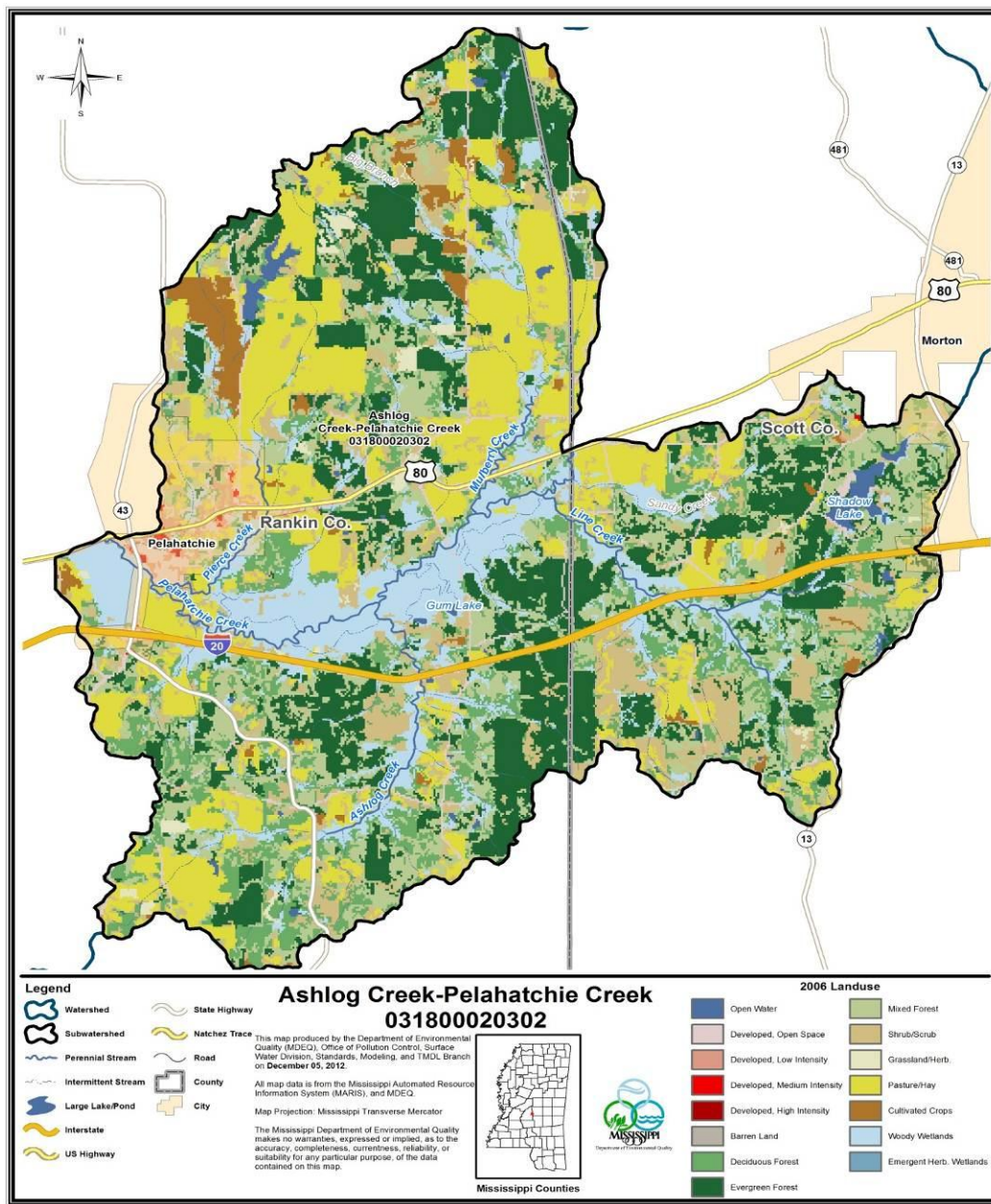
The MWCRT is a spatially-based tool used to characterize and rank all 10- and 12-Digit HUCs, watersheds and subwatersheds, respectively, for all major river basins in Mississippi. The data within the MWCRT are summarized and assessed to characterize each of those watersheds and subwatersheds. For the characterization(s), data layers are placed into two major categories based on whether the layer is deemed to have resource value (environmental or human welfare, respectively), or whether it places potential stress on a subwatershed. Next, data are calculated as observations (counts), linear miles, and acres on the subwatershed level and normalized using a linear-transform equation. The normalized data are weighted by relative importance to create the ranking system. Each data layer can then be assessed individually or combined to drive the output from the MWCRT.

The MWCRT provides a scientific method to allow managers to identify watersheds of interest, make meaningful decisions, and prioritize watersheds for restoration and protection activities. The end result has been that the tool has shortened evaluation times for identifying priority watersheds.

For 2012, The MWCRT was used in conjunction with data provided by the MDEQ §305(b) Assessment Section, MDEQ §303(d) TMDL Section and the Natural Resources Conservation Service (NRCS) to

identify Watersheds for potential Section 319 Nonpoint Source Success Stories and help drive current monitoring to locate future potential success stories.

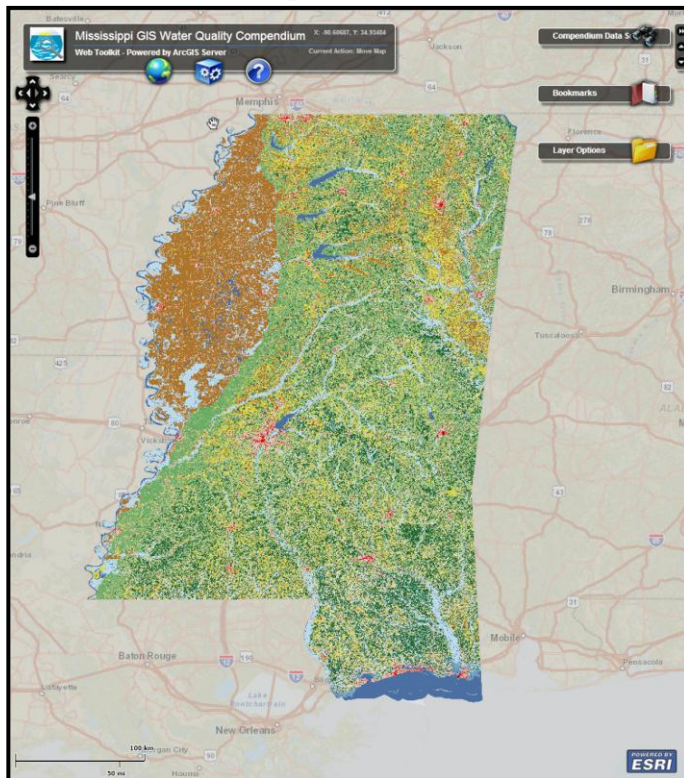
In addition, information from the MWCRT was used to help identify priority watersheds for targeted funding under the National Water Quality Initiative (NWQI). The NWQI was established by the National Resource Conservation Service (NRCS) to assist qualified landowners in targeted watersheds improve water quality and aquatic habitats in impaired streams. This was done by installing conservation practices such as cover crops, filter strips, and terraces. The MWCRT identified three watersheds for consideration under the program. These watersheds are Pelahatchie Creek - Ashlog Creek (031800020302), Porter Bayou (080302070500), and North Tippah Creek (080302010502). For more information about the NWQI, please visit the following link: [National Water Quality Initiative](#).



Mississippi Water Quality Data Compendium

In 2012, the NPS Branch continued to support the development of the *Mississippi Water Quality Data Compendium* (hereafter called *The Compendium*) by adding new searchable layers and updating existing background layers to the tool. *The Compendium* was developed in an effort to coordinate a wide variety of data collection activities and improve inter-agency communication and coordination concerning water-quality data collection among the U.S. Army Corps of Engineers (USACE), U.S. Geological Survey (USGS), and the Mississippi Department of Environmental Quality (MDEQ). *The Compendium* is a web-based GIS application that shows the location of data collection sites or projects. It provides a description of the data including contact information to obtain necessary water-quality data. *The Compendium* includes information on the existing water-quality data in a simple user-friendly interface.

The goal(s) of *The Compendium* are:



- Foster increased access and use of the existing data;
- Identify gaps and/or overlaps in data collection;
- Promote collaboration and coordination of monitoring activities to improve data collection
- Planning and maximize efficient use of available resources;
- Establish a sustainable process to routinely update the data compendium; and
- Improve natural resource management.

Data sets are categorized, described, listed and geographically queried and served to users.

The Compendium also provides the ability to zoom to a specific area and filter out all the available water- quality data in the specified area. The user will also be able to generate reports and maps. In addition, The Compendium provides website links for

additional information and brief descriptions of each project along with respective data layers. These are listed below:

Data Search Layers

MDEQ Data: Point Source Permits, Stormwater Permits, Section 319 BMP Sites, enSPIRE Sites, MDEQ Office of Land and Water - Surface Water and Groundwater Permits

USACE Data: Yazoo Basin Sites

USGS Data: Real-Time Water Quality Sites, Real-Time Stream Flow, Surface Water Quality after 1980, Surface Water Quality before 1980, Groundwater Quality Sites

Background Layers

303d Impaired Waters, Drainage Areas, NLCD 2006 Landuse, Water Designated Uses

Click on the link below to access the data compendium: [Mississippi Water Quality Data Compendium](#)

WRMS

Water Resources Management System (WRMS) is a custom implementation of *Watershed-The System*, an extensive GIS-enabled solution developed by Cengea Solutions, Inc. hereafter called *Cengea*. The NPS Program contracted *Cengea* to develop WRMS to help meet its grant tracking obligations. The NPS Management Branch uses WRMS to enter, manage, map, analyze, and report information about the NPS 319 program, budget, and activities. The system contains many modules but seven modules are used by the NPS Program. The modules are: 1) Cooperators; 2) Planner; 3) Watershed Projects; 4) Cooperator Projects; 5) Fund Manager; 6) Map and; 7) Reporting Modules.

The WRMS was originally configured to take a project-driven approach. In terms of budgeting, it remains project oriented and facilitates managing of funds through four stages: Granted, Planned, Awarded, and Spent. Four NPS Program work-elements are created, premised on the grant-budget work elements. These elements are further sub-divided into program areas such as in-house versus 3rd-party activities and Education/Outreach and CZARA projects. Sub-grants and contracts are then let and organized into the above elements. WRMS is used to track these activities and their funding.

This year, the NPS Program has had WRMS modified so that in addition to expressing projects, it can also reflect watershed and/or regional plans that may be only part of a project, or may involve multiple projects. This will allow analysis and reporting based more directly on actions taken or endeavored in the State, and not just on the projects alone.

The Planner Module allows users of the application to create and manage a set of goals and objectives for the NPS Program and identify indicators that can measure progress in fulfilling them. Projects can also be associated with them.

The Map Module uses a GIS service to view surface features in Mississippi and record or see and analyze where NPS Program activities are taking place. As originally packaged, the WRMS was tied to a specific version of a GIS server. This year, since MDEQ uses newer GIS software than the WRMS mapping tools required, NPS decided to use in-house GIS services. This conversion has been effected, but it will take time to discover and build the features into it that will properly support spatial analysis and reporting of NPS activities and strategies. Another enhancement was to provide a means of migrating BMPs from spreadsheets submitted by contractors to the WRMS application and its GIS component. This tool was used to migrate the (~2,000) legacy BMPs as well as new BMPs from several current projects.

MDEQ communicates with many partnering agencies, contractors, and sub-grantees who have varying relationships to NPS projects some cases these partners communicate with members of the public that also participate in these projects. A list of these organizations is maintained in the WRMS Cooperators Module.

Finally, the Reporting Module is being used to run about a dozen canned reports that have now been written for specific MDEQ NPS needs.

MDEQ NPS Program
6 Sub-Grantees/Contractors with 9 Active Projects (MOAs)
11/6/2012

COOPERATOR	DIVISION or ACTIVITY CD	PROJECT NAME	COOPERATOR TYPE	PROJECT STATUS
Central Ms RC&D			Non-Profit	
	1532-0800	Central Ms RC&D Teacher Workshops GY11 (2 yrs)		On Schedule
Delta F.A.R.M.			Non-Profit	
	1515-0100	Porter Bayou Nutrient Reduction Project		On Schedule
	1515-0200	Harris Bayou Nutrient Reduction Project		On Schedule
	1525-0200	Bee Lake Nutrient Reduction Project		On Schedule
	1535-0200	Coldwater River Nutrient Reduction Project		On Schedule
Foundation for MS Public Broadcasting			Non-Profit	
	1532-0200	Foundation for Ms Public Broadcasting (MS Outdoors) - GY11		Revised
Ms Coastal Plain RC&D			Non-Profit	
	1532-1200	MS Coastal Plain RC&D Teachers Workshop (3 years)		On Schedule
MS Forestry Foundation			Non-Profit	
	1532-1000	Project Learning Tree (Ms Forestry Foundation) (1 yr)		Approved
Northwest MS RC&D			Non-Profit	
	1512-0400	NW MS RC&D Teachers Workshops - GY09		On Schedule
Active sub-Grantees/Contractors as of 11/6/2012: 6				
Active projects (MOAs): 9				

Figure 1. Example Report: Active Projects let out to Non-Profits only.

Mississippi Agricultural Chemical Groundwater Monitoring Program

The *Mississippi Agricultural Chemical Groundwater Monitoring Program* is an ongoing program initiated in March, 1989, for the purpose of determining if the use of agricultural chemicals is impacting groundwater quality in Mississippi. During the calendar year 2012, 74 samples have been collected from a total of 66 source locations. Included in this total were 51 drinking water samples; 22 irrigation, fish-culture or wild-life management samples; and one surface water sample. The program remains committed to testing wells statewide as well as those located in the highly agricultural Mississippi Delta. Three samples of the 74 samples analyzed revealed organic compounds in excess of Federal Primary Drinking Water Standards. Two samples had detects for Beta-hexachlorocyclohexane (Beta-HCH). The detects were reported at 1.500 ug/L and 0.36 ug/L respectively. Believing these to be erroneous analyses or tainted samples, the wells were resampled immediately following the initial detects, with both subsequent resamples reporting 0.0000 (No Detect) for the Beta-HCH compound. Additionally, one sample reported a detect of 4-Nitrophenol in the amount of 0.0094 ug/L. This resample also reported 0.00 ug/L for 4-Nitrophenol (No Detect). Analyses of the other 74 samples performed by the Ag-Chem program did not

detect any agricultural chemicals or other organic compounds exceeding Federal Primary Drinking Water Standards and/or State of Mississippi Groundwater Standards. One public supply well reported 5.0 mg/L for Nitrate-Nitrite-Nitrogen. This well may need to be checked periodically due to the combination of local surface geology and surrounding poultry industry even though it was below the Federal Primary Drinking Water Standard of 10.0 mg/L.

In addition to monitoring groundwater for harmful compounds, the AgChem Program actively participates in other programs involved in protecting groundwater in Mississippi. One of these programs is the Mississippi Pesticide Container Recycle Program. During the calendar year 2012, a total of three days have been spent out of the office for field activities related to this program. Although complete amounts are not yet available, it is estimated that a total of over 637,000 pounds of plastic pesticide containers will be recycled during this calendar year.

Supplemental Watershed Implementation Project Monitoring

The U.S. Geological Survey (USGS) - Mississippi Water Science Center and the Mississippi Department of Environmental Quality (MDEQ) have an ongoing partnership to implement monitoring plans for selected 319-funded restoration projects. To date, monitoring is ongoing in six watersheds. One watershed is temporarily inactive until conditions stabilize after restoration efforts. Two watershed projects were recently completed with data collection and are in the data-analysis and report-writing phase.

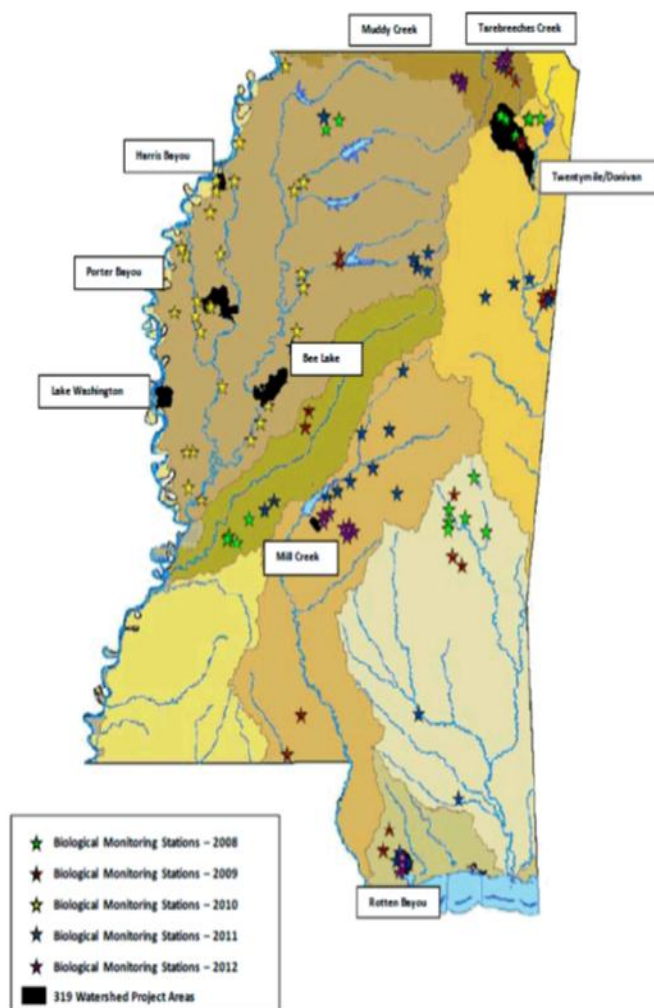
Biological monitoring is performed annually at various locations throughout the State in waters that were assessed as impaired and where BMPs were implemented in the recent past. The USGS progress report summarizes efforts from all watershed projects to date as well as statewide biological monitoring efforts. Final data and interpretations will be published as an interpretive report at the conclusion of each individual project.

ONGOING

- Harris Bayou
- Porters Bayou
- Bee Lake
- Tarebreeches Creek
- Muddy Creek
- Rotten Bayou

TEMPORARILY INACTIVE

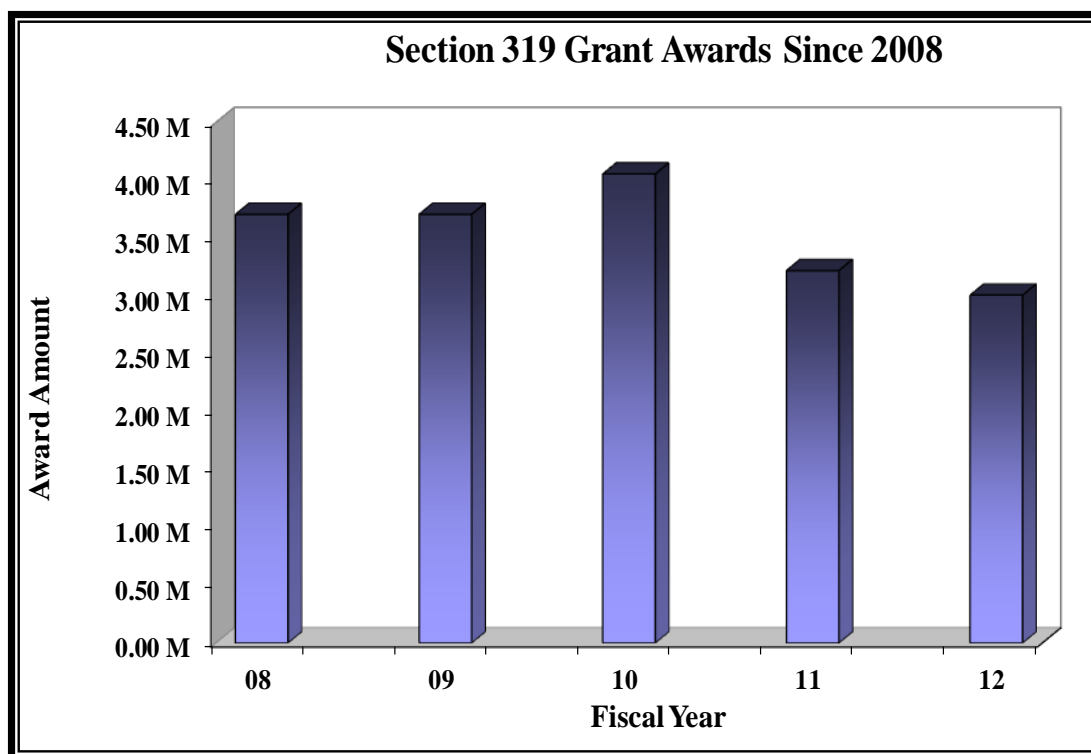
- Lake Washington



Mississippi Conjunctive Water Management

The Mississippi Delta (hereafter called Delta) has been experiencing declines in both surface water and groundwater for several decades. These declines have reached levels that potentially place agricultural production, community welfare, and environmental quality at risk. These declines have also added an additional level of complexity and influenced the approaches MDEQ and its partners have developed to reduce excessive nutrient loadings in the Delta. To address these issues, a Delta Sustainable Water Resources Task Force has been formed to develop and implement approaches that will restore and sustain surface and groundwater resources in perpetuity. Technical support is needed to develop, expand and/or implement scientifically sound, economically feasible, and socially acceptable strategies that can be implemented in the Delta, adding further to the Delta Nutrient Reduction Strategies developed in 2009. Many of the strategies and practices being implemented through the Delta Nutrient Reduction Strategies not only reduce nutrients, but also conserve water. *The Path Forward* concept was developed by the Conjunctive Water Management Work Group of the Delta Sustainable Water Resources Task Force in order to apply quantitative ranking criteria to prioritize alternative water supplies and to develop a metric(s) that is quantitative and consensus-based as well as illustrating sustainable water resources in the Delta. Through this concept, numerous strategies will be advanced and implemented including: watershed characterization, current and historical trends, economic incentives and funding, stakeholder awareness/education/outreach, best management practices, monitoring, and analytical tools.

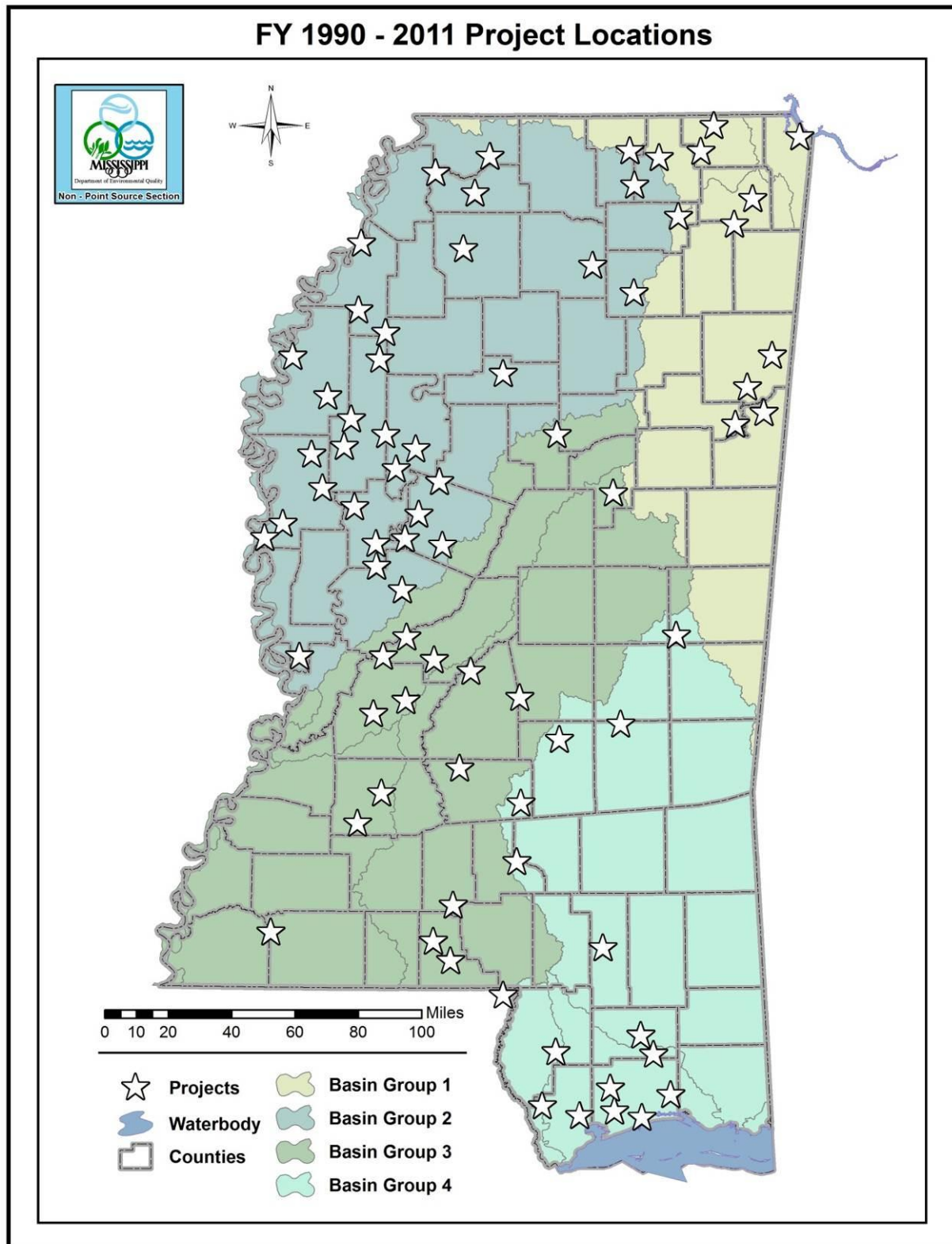
Section 319 Watershed Projects



Program Funding

Since the inception of the §319 Nonpoint Source Program in 1990, various types of projects have been funded, including demonstrations of BMPs in watersheds; agricultural/chemical waste disposal; alternatives for converting dairy-cow wastes into electrical power and preventing possible stream pollution from those wastes; industrial-plant demonstrations that focused on preventing NPS pollution in industrialized watersheds; coastal streams ecosystem restoration; conservation easements that encouraged and assisted farmers to place lands into riparian-buffer strips; development and implementation of approaches that will restore and sustain surface and groundwater resources in perpetuity in the Mississippi Delta; and a variety of educational and outreach projects. Two recent and salient educational and outreach products have included two manuals: 1) *Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas* and; 2) *Nutrient Management Guidelines for Agronomic Crops in Mississippi*. In recent years, §319 NPS funding has been used more and more to support nutrient reductions in large watersheds. The strategy behind this approach is to use the committed §319 resources to attract additional leveraging opportunities, that together, create a greater potential to achieve quantifiable reductions in nutrient concentrations/loadings. A special effort is focused on the Mississippi River Basin Initiative. This initiative, in turn, focuses on reduced nutrient input from agricultural lands that drain into the Mississippi River and contribute to the Gulf of Mexico's hypoxia problem. Another important initiative is a partnership with NRCS relative to their *National Water Quality Initiative (NWQI)*. In this effort, NPS funds are being used to support monitoring efforts on NWQI sites where the NRCS has implemented BMPs. With these large-scale projects, it is anticipated that a heightened focus on pre- and post-implementation monitoring will document the improvements in

resulting water quality. During the first year of the NWQI, over \$1.2 million dollars have been obligated towards the implementation of planned BMP's through 3 priority watersheds and \$406,200 have been liquidated towards the completion of 760 on-the-ground BMPs.



Numeric Nutrient Criteria Development

In 2012, MDEQ continued development of numeric nutrient criteria for Mississippi's water bodies. MDEQ's mission is to develop scientifically defensible criteria that are appropriate and protective of Mississippi's waters using a process that is transparent, replicable, and based on the latest technical guidance. Criteria for each water-body type will be coordinated with those of other waters to ensure consistency and to protect downstream uses.

Highlights of MDEQ's numeric nutrient criteria development efforts within 2012 include:

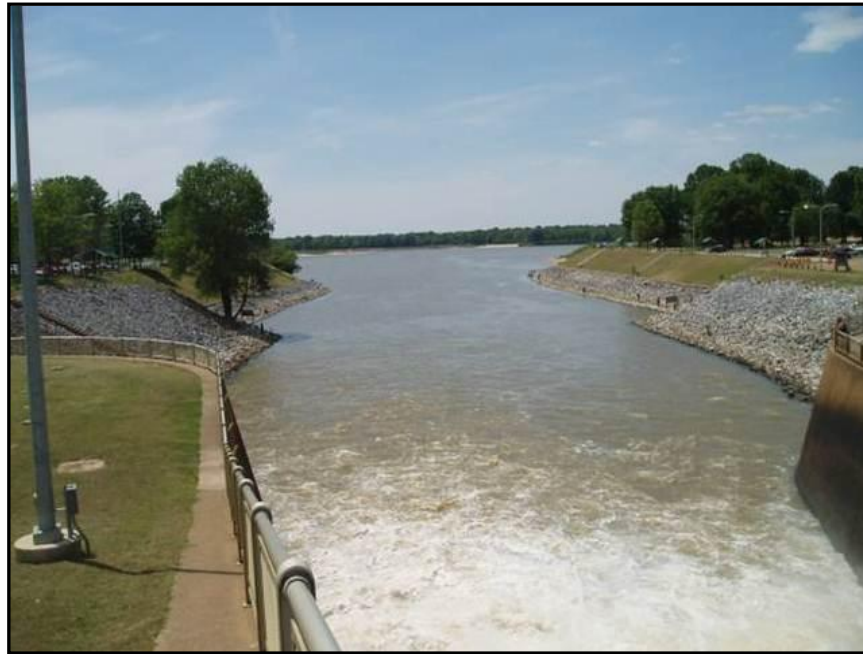
- The Mississippi Nutrient Technical Advisory Group (hereafter called the TAG) held three meetings in 2012. The mission of the TAG is to provide technical expertise and regional knowledge to MDEQ for the development of scientifically defensible numeric nutrient criteria. The TAG consists of over 30 members representing a broad range of scientific and engineering technical expertise from multiple state and federal agencies and four of Mississippi's universities. The 2012 TAG meetings focused on providing continued technical input on developing nutrient criteria for Mississippi's Wadeable and non-Wadeable streams, lakes and reservoirs, coastal and estuarine waters, and Mississippi Delta waters. MDEQ continues data analyses efforts based on recommendations from the TAG. The TAG will continue to meet quarterly throughout the criteria development process to help MDEQ meet the timeline and schedule within *Mississippi's Nutrient Criteria Development Plan*.
- In 2012, MDEQ held the first Nutrient Criteria Update Session for Mississippi stakeholders. The objectives of the update session were to both provide stakeholders with an update regarding the development of the criteria as well as promote open communication among MDEQ staff and stakeholders. MDEQ plans to hold update sessions regularly with this group throughout the derivation process of numeric nutrient criteria development. MDEQ's goal is to promote transparency of the process and provide stakeholders an opportunity to ask questions and provide feedback to MDEQ and the TAG.
- *Mississippi's Nutrient Criteria Development Plan* outlines the process and timeline the State intends to follow for numeric nutrient criteria development. The current plan was mutually agreed upon by the State and EPA in October 2010. Numeric nutrient criteria are being developed based on water-body type and are divided into the categories of (1) Wadeable streams, (2) non-Wadeable streams, (3) Mississippi Delta waters, (4) lakes and reservoirs and, (5) coastal and estuarine waters. The public comment period will begin June 30, 2013 for lakes and reservoirs, Wadeable streams, non-Wadeable streams, and coastal and estuarine waters. The public comment period will begin on November 30, 2014 for Mississippi Delta waters. Mississippi continues to make progress successfully implementing its plan. Mississippi is currently on track with the timeline within this plan.

Nutrient Reduction Strategies

Mississippi's collaborative, leveraged approach to reduce excessive nutrients and their impacts focus on the development and implementation of appropriate nutrient reduction strategies. During 2009, strategies were developed to reduce excessive nutrient loadings for the Mississippi Delta, the primary region of row-crop agriculture and aquaculture in the State. This effort was co-led by MDEQ and Delta F.A.R.M. (Farmers Advocating Resource Management). During late 2009, MDEQ, working through the Gulf of Mexico Alliance's Nutrients Team, facilitated the development of a common template for Gulf of Mexico States to encourage a consistent, aligned approach to reduce excessive nutrients regionally. This template

is now being implemented in Mississippi and Louisiana as both states use it to guide them in developing state-specific nutrient reduction strategies for their coastal watersheds. In Mississippi, this effort is co-led by MDEQ and the Mississippi Department of Marine Resources (MDMR). During September 2010, MDEQ, working through the Hypoxia Task Force, facilitated the development of a common framework for states within the Mississippi/Atchafalaya River Basin to reduce excessive nutrients and mitigate Gulf hypoxia. Additionally, in a similar effort, Mississippi also developed nutrient reduction strategies for the upland areas of the State.

In 2012, strategies for the Delta, coastal, and uplands were consolidated to establish a comprehensive, state-level approach to reduce nutrient loadings from nonpoint and point sources. This is regardless of whether loadings are in a predominately agricultural environment, higher municipal and industrial environment, or more natural coastal environments.



Basin Management Approach

The mission of the Basin Management Approach is to foster stewardship of Mississippi's water resources through collaborative watershed planning, education, protection and restoration initiatives. To accomplish this, ten of Mississippi's major river basins have been organized into four basin groups. Each basin group has a basin team of state and federal agencies, non-governmental organizations, and other stakeholders.

Implementing Nutrient Reduction Strategies and TMDLs on the Mississippi Coast

Basin Group 4 (Pascagoula River, Coastal Streams, and Lower Pearl) has received the emphasis of more protection-oriented watershed projects in contrast to restoration-oriented projects. These projects have focused on the acquisition of conservation easements and have also included the installation of BMPs at Dead Tiger/Orphan Creek, Red Creek, and Turkey Creek. Turkey Creek is an EPA- and MDEQ-priority watershed. These projects are currently in the implementation phase. The Wolf River Conservation Society has completed a Watershed Implementation Plan that includes both 1) Protection and Restoration Projects and; 2) Education and Outreach Projects.

A *Coastal Mississippi Nutrient Reduction Strategy* has been developed by MDEQ and their partners. This *Coastal Nutrient Reduction Strategy* is currently being implemented in a coastal Mississippi watershed project in Rotten Bayou. **See Rotten Bayou Watershed Project** below.

The third annual *Battle on the Bayou* was held on the Old Fort Bayou Blueway where over 200 canoes and kayaks paddled down a 9½-mile trail. Blueways, which are paddling trails on waterways, have now been developed on Old Fort Bayou, the Pascagoula River, Red Creek, and the Jourdan River. Blueways are also planned for Turkey Creek, Tchoutacabouffa River, and the Wolf River.

Implementing Nutrient Reduction Strategies and TMDLs in the Mississippi Uplands

The *Upland Nutrient Reduction Strategy Implementation* in the North Independent Streams Basin has been progressing according to schedule. Two watersheds have been selected for installation of BMPs that will reduce nutrient pollution. These are the Bell-Muddy Creek Watershed in Tippah County and Tarebreeches Creek Watershed in Alcorn County. BMPs installed in the Bell-Muddy Watershed are: 1) 1,265 feet of stream-bank and shoreline protection; 2) three water and sediment-control basins; 3) four grade- stabilization structures; 5) 1,132 feet of fencing; 6) 14.5 acres of critical-area planting and; 7) 11 acres of pasture and hayland planting. The Tarebreeches Creek Watershed has the following BMPs: 1) 309 acres of pasture and hayland planting; 2) two heavy- use area protections and; 3) one tank/trough. More BMPs will be installed throughout the project period.

USGS has monitoring sites in both of the above watersheds. USGS is anticipated to capture the change in runoff due to the installation of these BMPs. Remaining BMPs to be implemented over the course of this project will also be monitored. Monitoring began in February 2012 on both watersheds and consisted of sampling for nutrients, sediment, and biological integrity. Sampling is conducted every four weeks at five sites in the Bell Muddy Creek Watershed and at four sites in the Tarebreeches Watershed.



Implementing Nutrient Reduction Strategies and TMDLs in the Mississippi Delta

Seven watersheds have been identified for implementation of nutrient reduction strategies in the Mississippi Delta, which is in Basin Group II. These include three new projects, one each in the Harris Bayou, Porters Bayou, and Coldwater River watersheds respectively, and the expansion of four existing sediment-reduction projects in the following watersheds: 1) Bee Lake, 2) Wolf/Broad Lake, 3) Lake Washington and, 4) Steele Bayou.



Porter Bayou, a tributary of the Big Sunflower River, flows through portions of Bolivar and Sunflower counties. The Porter Bayou project is comprised of the North Project Area (1,000 acres) and the South Project Area (2,500 acres). Installation of nutrient-reduction BMPs in the north project area was completed in 2011. Installation of BMPs in the south project area was completed during 2012. Installed BMPs include the following: 1) a two-acre tail-water recovery system; 2) an eight-acre, on-farm storage reservoir; 3) 100 acres of land

formed; 4) five low-grade weirs; 5) 88 water-control structures and; 6) a two-stage, 24,156 ft-long ditch. Collection of nutrient data for this project is currently ongoing. Harris Bayou, also a tributary of the Big Sunflower River, flows through portions of Bolivar and Coahoma counties. The Harris Bayou project is comprised of two project areas, a *treatment area* of 1,700 acres and a *control area* of 1,300 acres. Installation of nutrient-reduction BMPs in the treatment area was completed during 2012. Installed BMPs include the following: 1) a five-acre, tail-water recovery system; 2) an on-farm storage reservoir (16.75 acres); 3) 210 acres of land formed; 4) six low-grade weirs; 5) 14 water-control structures; 6) a two-stage, 10,000- ft-long ditch and; 7) a 600 ft-long grassed waterway. No BMPs were installed in the control area in order to maintain it as an area for comparison. Also, collection of nutrient data for this project is currently ongoing. Coldwater River, a tributary of the Tallahatchie River, flows for about 220 miles through portions of Coahoma, Desoto, Marshall, Quitman, Tate, and Tunica counties in northwestern Mississippi. The Coldwater River project is comprised of three sites. Several nutrient-reduction BMPs were installed at these sites during 2012. Installed BMPs include the following: 1) two on-farm storage reservoirs/ tail-water recovery systems; 2) 240 acres of land formed; 3) three low-grade weirs; 4) 11 water-control structures and; 5) a two-stage 3,000-ft ditch. Also, collection of nutrient data for this project will begin soon. Bee Lake is a 1400-acre oxbow lake located in Holmes County. Primary inflow to Bee Lake is through Tchula Lake, a nearby oxbow lake. Inflow occurs during high-water periods in the spring, and outflow is back through Tchula Lake to the Yazoo River. The Bee Lake phase II project is comprised of one project area of 740 acres. Several nutrient-reduction BMPs were installed in the project area during 2012. The installed BMPs include the following: 1) three low grade weirs; 2) eight water-control structures and; 3) a two-stage, 3,000 ft-long ditch. Also, collection of nutrient data for this project is currently ongoing.

Implementing Nutrient Reduction Strategies and TMDLs in the Big Black, Pearl River, and South Independent Streams

The Ross Barnett Reservoir (hereafter called the Reservoir) in Basin Group III is a vital resource to Central Mississippi. It is the largest source of drinking water in the State, supplying over 15 million gallons of water to local residents, businesses, and industries. The Environmental Protection Agency has designated this area as a priority watershed. The Reservoir welcomes in excess of 2.5 million visitors annually and many consider it to be the premier recreational water body in Mississippi. Since its development almost 50 years ago, it has provided immeasurable benefits to the local economy. Local communities are continuing to benefit from increased residential and commercial growth, largely attributable to the reservoir.

The Mississippi Department of Environmental Quality (MDEQ) and Pearl River Valley Water Supply District (PRVWSD), along with other partners, has finalized plans to restore and protect water quality within the Reservoir. This initiative, which is known as *Rezonate*, focuses on six priority issues in the watershed: 1) erosion and sedimentation; 2) pathogens; 3) litter/trash in the reservoir and around the shoreline; 4) nutrients/organic enrichment; 5) invasive species and; 6) pesticides.

As part of the *Rezonate* initiative, five plans have been created for the Reservoir. These include: 1) a comprehensive watershed protection and restoration plan; 2) a water-quality monitoring plan; 3) a source-water protection plan (SWPP); 4) a comprehensive education and outreach plan and; 5) a pathogen source-assessment and wastewater- management plan. The watershed protection and restoration plan uses *EPA's Nine Key Elements of Watershed Protection* to identify potential pollutant sources



Bowie Creek

in the watershed. The plan also recommends a set of conservation measures to address the priority pollutant issues and ensure that these measures are implemented. MDEQ and PRVWSD facilitated the development of these plans through workgroups that used technical expertise from various state and local agencies, and local stakeholders.

Recently, through the *National Water Quality Initiative* (NWQI), the Natural Resource Conservation Service (NRCS) along with MDEQ identified mutually agreed upon high-priority watersheds affecting the Reservoir. These were selected for the installation of targeted BMPs. Three watersheds were selected, one of which was Pelahatchie Creek-Ashlog Creek, a tributary located in the Pearl River/Reservoir Watershed, and one of the four targeted priority watersheds selected for restoration through the *Rezonate* comprehensive plans developed for the Reservoir. The other two watersheds were Porter Bayou (Big Sunflower Watershed) and North Tippah Creek (Tippah River Watershed). These watersheds are

considered impaired and funding through this initiative will reduce the runoff of nutrients and sediments into them. NRCS will continue to coordinate with local and state agencies, conservation districts, non-governmental organizations, and others to implement this initiative. This strategic approach will leverage funds and provide streamlined assistance to help individual agricultural producers take needed actions to reduce the flow of sediment, nutrients, and other runoff into impaired waterways.

The PRVWSD and the Barnett Reservoir Foundation, a newly formed non-profit organization established to promote the Reservoir and surrounding businesses, hosted the *1st annual Independence Day Celebration* on the Reservoir simultaneously at Old Trace and Lakeshore Parks in Madison and Rankin Counties. The *Independence Day Celebration* held on June 30, 2012 saluted our country's troops. Event activities included kid zones, live music, food vendors and static military displays. Patrons of both parks viewed the 1st annual lighted boat parade and a grand fireworks display that climaxed the evening's activities. An estimated 5,000 people attended the event.

An Education Outreach Implementation Plan has been developed to meet the educational needs of six specific target audiences that live, work, and recreate in the Reservoir Watershed. Identification of target audiences will allow MDEQ and PRVWSD to tailor messages and education materials. Specific goals and objectives for each targeted audience have been designed to reflect each group's interests, and provide opportunities for each audience to take actions to improve water quality. The targeted audiences included in the Education Outreach Plan are:

1. General Public
2. Educators/Students in Area Schools
3. Homeowners Associations
4. Area Civic and Recreational Organizations
5. Decision Makers – (municipalities and municipal staff, inspectors, local leaders, elected officials, public department heads, planners, economic development officials, and business owners)
6. Land Development Professionals (developers and contractors).

The education/outreach goal through the end of this campaign is to move a large percentage of the target audience(s) through the stages of awareness, retention, and finally to acceptance. The implementation of behavior-change plans that target a smaller audience and require outreach on a more personal level will focus on attitude change (desire) and behavior change (action). Another goal of the awareness campaign is to maximize limited resources. Activities will be selected as funding allows to implement a three-year consecutive campaign. The aim of the three-year campaign period is to reach the target audience(s) on a consistent basis to increase awareness.

In 2012, MDEQ and PRVWSD agreed to demonstrate techniques to stabilize eroding stream banks, reduce sedimentation and NPS pollution that drains into the Reservoir Watershed. Due to NPS pollution from sediment and nutrients, primarily as a result of urbanization and recreation, various BMPs that can reduce sediment and peak, storm-water flow loadings need to be implemented.

Showcased Section 319 Projects

Porter Bayou and Harris Bayou Nutrient Reduction Projects



The 66,405-acre Porter Bayou Watershed is located in Bolivar and Sunflower Counties, Mississippi. The watershed is comprised predominately of productive agricultural lands making up nearly 56,000 acres (82%) and urban areas making up only 3,882 acres (5.8%) of the total watershed area.



The 71,592-acre Harris Bayou Watershed is located in Bolivar and Coahoma Counties, Mississippi. The watershed is comprised predominately of productive agricultural lands making up nearly 57,000 acres (79.4%) and urban areas making up only 5,201 acres (7.3%) of the total watershed area.

The main objectives of these nutrient reduction projects are to accurately determine what reductions are achievable using BMPs and the cost to implement these practices. These objectives are being accomplished by educating

local farmers with the following: 1) management practices that reduce nutrient input; 2) innovative farming practices and; 3) other measures that include installing vegetative and structural BMPs such as low-grade weirs, constructed-treatment wetlands, grade-control structures and tail-water recovery systems. As of late 2012, over 100 BMP structures for water control have been implemented throughout these two projects as well as 2 irrigation storage reservoirs, 3 tailwater recovery systems, and several other BMP types. Through education and implementation of these practices, a high benefit-to-cost ratio

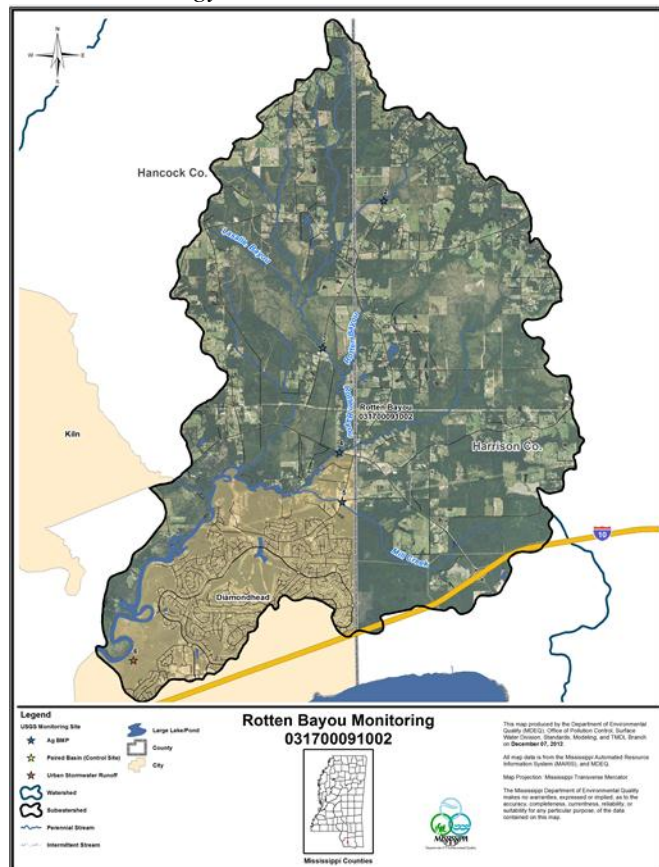
is achieved. The public is being equipped with the necessary tools to improve the water quality within their watershed that will last from generation to generation. The USGS implemented several in-stream monitoring strategies to document the nutrient reduction and water quality in the streams over several years. As data is beginning to be compiled as these projects near completion, for example, analytical models projecting positive water quality results are being achieved. Nutrient- load reductions for the stated BMPs have already begun to show reductions of over 4,600 lbs/yr of Phosphorous, 9,400 lbs/yr of Nitrogen and 4,300 tons/yr of sediment in Mississippi waters.

Rotten Bayou

The Rotten Bayou Watershed Project was developed to implement the *Coastal Nutrient Reduction Strategy*. This strategy used the Gulf of Mexico Alliance (GOMA) Coastal Template and leveraged on work done in the Delta with the *Delta Nutrient Reduction Strategy*. The *Coastal Nutrient Reduction Strategy* was developed through local

workshops with coastal stakeholder input. Various issues relative to livestock, forestry, urban stormwater, and atmospheric deposition were included in the strategy. As part of the Federal government's efforts to recover from the Deepwater Horizon oil spill, NRCS announced the start of an innovative water- and wildlife-conservation effort along the Gulf Coast, called the *Gulf of Mexico Initiative (GoMI)*. NRCS developed GoMI in close collaboration with local, state, and federal partners. It is a new approach to better target conservation activities in the Gulf Coast region to improve the health of the Coast's rivers, wetlands, and estuaries that are integral to jobs and the economy in the Gulf. Because MDEQ had already developed and begun implementation of the *Coastal Nutrient Reduction Strategy* in Rotten Bayou Watershed, NRCS targeted it for the their GoMI Project. The Mississippi Soil and Water Conservation Commission, the Soil and Water Conservation District, and NRCS, have been working with local landowners in the Rotten Bayou Watershed to install

agricultural Best Management Practices (BMPs). Some of the available BMPs to landowners in the watershed are: 1) pasture and hay planting; 2) nutrient management; 3) tank/ troughs; 4) tree and shrub establishment; 5) forest harvest trails and landings and; 6) vegetative barriers. To develop a Watershed Implementation Plan for this project, the Land Trust for the Mississippi Coastal Plain is working with local residents to form three teams: a watershed team, a technical team, and an education team. These teams will provide input to the plan. A kickoff watershed-team meeting was held at the Diamondhead Country Club on October 10, 2012. Also as part of this project, the Department of Landscape Architecture at Mississippi State University is working with the City of Diamondhead to develop Low Impact Development Urban Best Management Practices for reducing stormwater NPS pollution.



Ross Barnett Reservoir



Photo by Rex Allan Jones

As mentioned previously, the Ross Barnett Reservoir is a vital resource to central Mississippi largely because of its drinking water benefit of supplying over 15-million gallons of water to over 175,000-local residents, businesses, and industries. In addition to what was mentioned above, MDEQ and PRVWSD developed a strategic approach that will leverage funds and provide streamlined assistance to help individual agricultural producers take needed actions

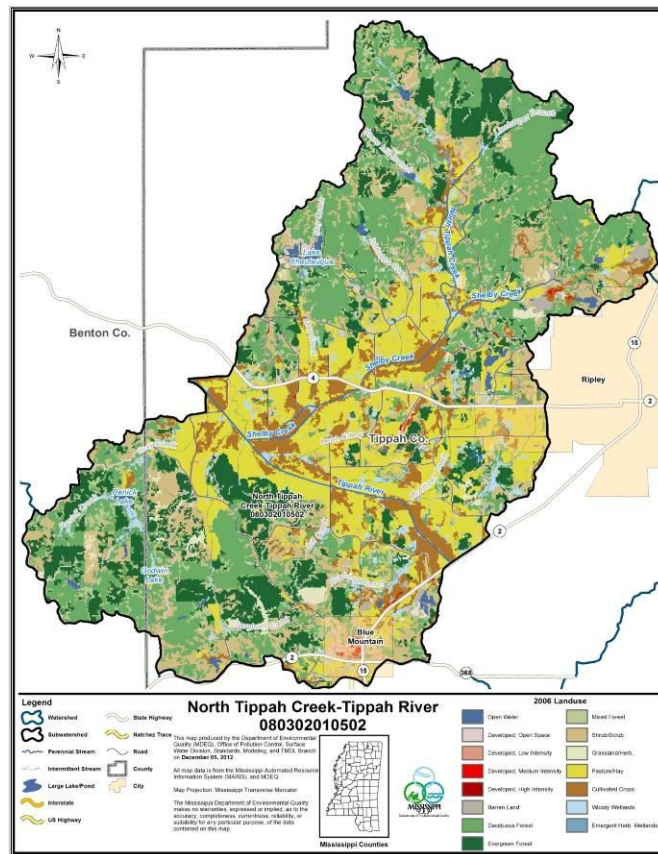
to reduce the flow of sediment, nutrients, and other runoff into impaired waterways that lead to the Reservoir. In 2012, a large-scale advertising campaign was enacted as a part of the initiative in order to educate the general public on the six priority issues. The campaign included 12, full-page color ads in the monthly Mississippi publication *Parents and Kids Magazine*, as well as weekly ads in two local newspapers and one statewide newspaper for 12 weeks. An example of an ad in the *Parents and Kids Magazine* is shown below.

BOTTOMS UP.

STORMWATER POLLUTANTS FIND THEIR WAY INTO WHERE WE FISH, WHERE WE SWIM AND WHAT WE DRINK. Everything that goes into our storm drains—sediment grass clippings, soap, pesticides, pet waste, litter whatever—makes its way straight to our streams. Stormwater pollution is our biggest source of water pollution. It all adds up. It all comes back. And you're the solution, now that you know where it goes. Remember, It's your water...your legacy!

North Tippah Watershed

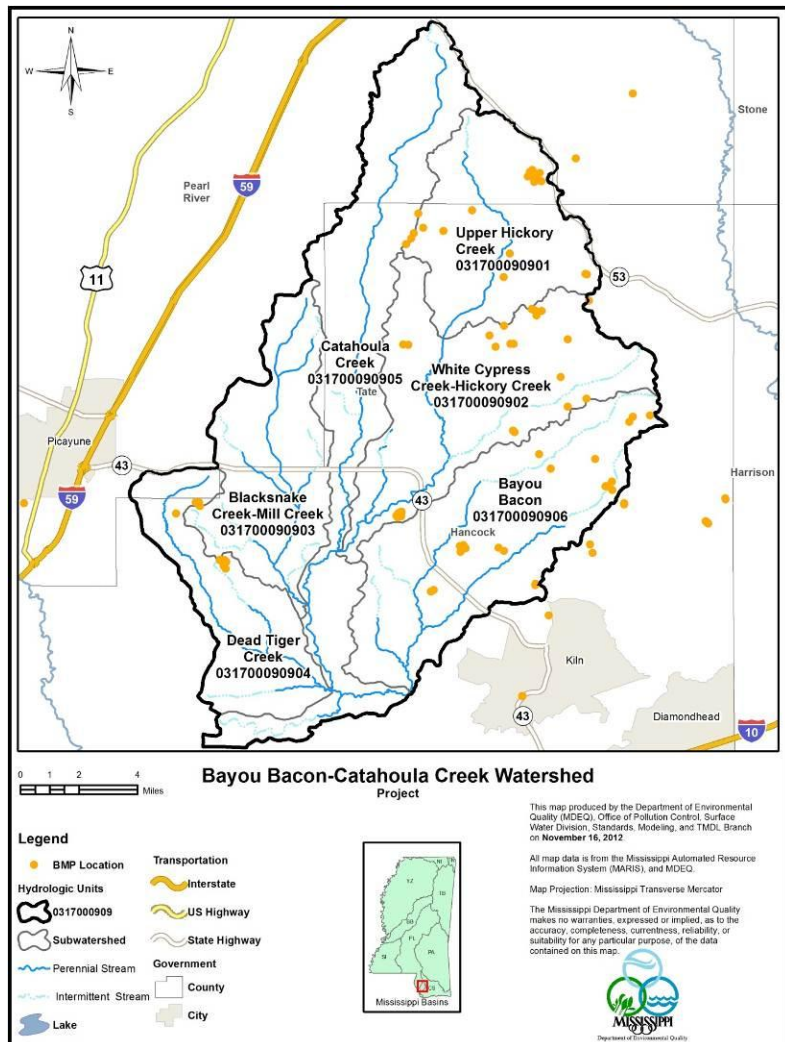
The State's 2012 303(d) list of impaired water bodies lists North Tippah Creek's designated use of fish and wildlife support as impaired due to adverse biological conditions. North Tippah Creek, a tributary of the Tippah River, flows 220 miles through portions of Coahoma, Desoto, Marshall, Quitman, Tate, and Tunica counties in northwestern Mississippi. The current land uses in the Tippah River Watershed include 60% cropland (about 21,316 acres), 10% pasture land (about 3,553 acres); 25% timber land (about 8,881 acres) and; 5% other lands (about 1,776 acres). Soils in the watershed are very erosive, with gully erosion occurring on sloping cropland and pastureland. Implementation of this project is currently ongoing (i) to inform/educate the public about the watershed and the things they can do to improve water quality and; (ii) to monitor water quality for determining the need for reducing nutrients and sediments with BMPs. This project will include development of a watershed team, a watershed plan, and educational and monitoring components. MSWCC will work with the NRCS, MDEQ, and the Tippah County Soil and Water Conservation District to identify stakeholders and others who need to serve on the watershed team. Once identified, MSWCC will facilitate the meetings of this team and the development of the Watershed Implementation Plan. . The education component will include measures that individuals can do themselves to reduce NPS pollution. The monitoring component of the project is being developed by the USGS and they will also carry out the monitoring itself. Collection of nutrient data for this project will begin soon.



Dead Tiger/Orphan Creek Watershed

The Dead Tiger/Orphan Creek Watershed is about 25,146 acres and located in Hancock County in South Mississippi. The Dead Tiger/Orphan Creek Watershed is comprised of the following: 44% pastureland, 54% timberland, and 2% wetlands, urban, and other. The majority of the timberland is in the buffer zone for Stennis Space Center.

Because of the high level of stakeholder interest and being listed on Mississippi's 303(d) list of impaired waters, the Dead Tiger/Orphan Creek Watershed was selected as a priority watershed for restoration in the Coastal Streams/Pascagoula River Basin. Therefore, a joint effort by the Mississippi Soil and Water Conservation Commission (MSWCC), MDEQ, EPA, the NRCS, and the Hancock County Soil and Water Conservation District (SWCD) resulted in a proposal and subsequent implementation of a project to significantly reduce the amount of nutrient and sediment loads entering Dead Tiger and Orphan Creeks.



The primary goals of the project are:

- To improve water quality and protect high quality waters through the implementation of selected BMPs in targeted areas;
- To reduce runoff and cattle access to streams thereby reducing nutrient and sediment loads
- To inform and educate the public about BMPs that benefit water quality

A summary of the BMPs installed to date in the project area and the tons of soil being saved is shown below. All landowners and producers are greatly thanked for voluntarily installing BMPs on their land. The benefits of this project show that the continued use of BMPs will protect water quality and save valuable topsoil.

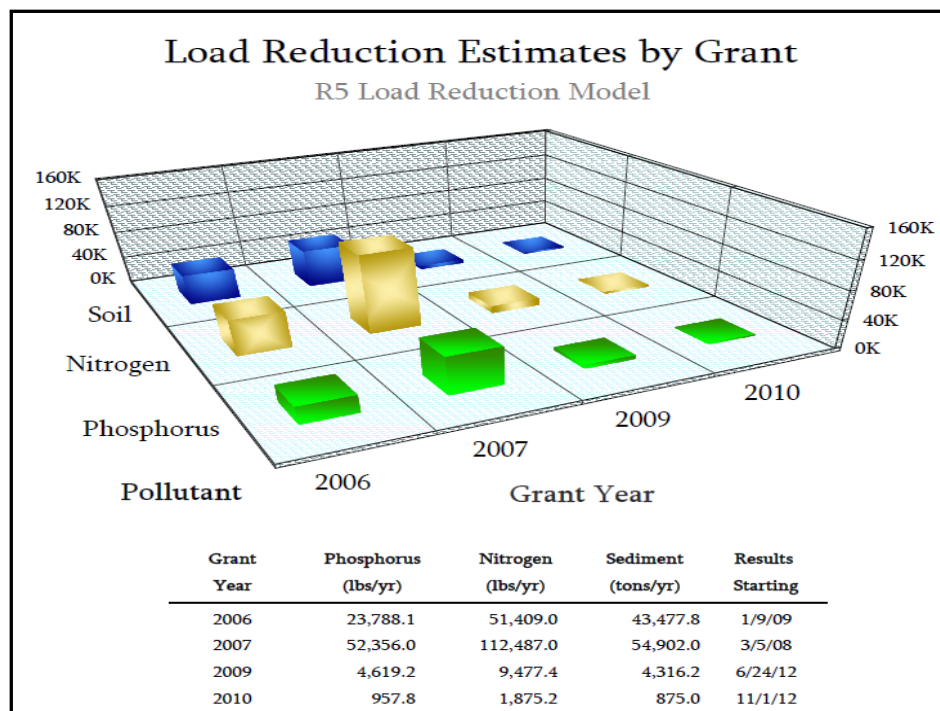
SUMMARY OF BEST MANAGEMENT PRACTICES INSTALLED TO DATE

Practice Name	Number of Practices	Number of Acres Affected	Total Tons of Soil Saved Per Year
342- Critical Area Planting	3	9	2,827.1
382- Fencing	8	15,884 feet	
590-Nutrient Management	18	409.5	1,607.2
512-1-Pasture and Hayland Planting	10	114.5	446.5
728-Stream Crossing	2		
614-Tank/Trough	2		
Totals	43	533	4,880.8

Estimated Nonpoint Source Load Reduction Achieved

The goal of many §319 funded projects is to control, reduce, and alleviate pollution loads into Mississippi's lakes, rivers, and streams. The use of BMPs such as soil stabilization, weirs, and filter-strips is the leading strategy for reducing NPS pollution impacts. These types of BMPs are easily recognized and their effectiveness is often easily calculated using the Region 5 (R5) mathematical model. The load reductions estimated in the R5 model include phosphorous, nitrogen, and sediment. The fundamental methodology of this model is based on *Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual* (Michigan DEQ, June 1999). Although the R5 model is an imperative tool in nutrient-reduction calculations, it is not inclusive of all BMPs. There are many other highly effective agricultural BMPs with impacts that are not as easily estimated, such as prescribed grazing, heavy-use area protection, and livestock fencing. The data calculated through the R5 model are entered into the Environmental Protection Agency's *Grants Reporting and Tracking System* (GRTS) so that the load reductions are available within the database. The total reductions for projects as of the 2011 grant year closeout were: Phosphorous-77,468.8 lbs/yr; Nitrogen-167,575.8 lbs/yr; and Sediment- 99,839.4 tons/yr. Additionally, thus far with on-going projects, the total reductions are: Phosphorous-6,185 lbs/yr; Nitrogen-18,745.8 lbs/yr; and Sediment- 5,677 tons/yr. These reductions are shown in the following table and three-dimensional graph respectively.

		R5 Model Estimated Total Load Reduction*		
Project Name	Project Period	Phosphorous (lbs/yr)	Nitrogen (lbs/yr)	Sediment (tons/yr)
Porter Bayou	3/15/10 – 8/31/13	1887.1	4012.2	1727.1
Harris Bayou	3/15/10 – 8/31/13	2732.1	5465.2	2589.1
Tarebreeches Creek	9/01/11 – 9/01/14	308.8	581.6	177.6
Bell/Muddy Creek	9/01/11 – 9/01/14	522.8	1041.3	571.4
Bee Lake	6/01/12 – 12/31/13	126.2	252.3	126.0
Rotten Bayou	9/01/11 – 9/01/14	608	7393.2	485.8
Total:		6185	18745.8	5677



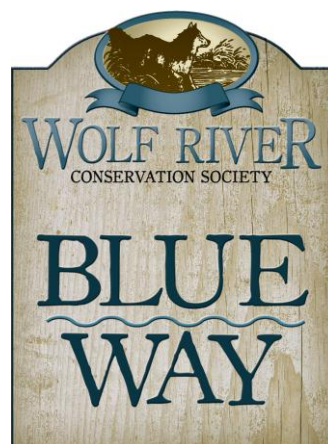
NPS Education/Public Outreach

Blueways

A project sponsored by a NPS grant introduced the concept of recreational paddling trails called *Blueways* to Mississippi citizens. This project was at Old Fort Bayou in Ocean Springs. Since that project, *Blueways* have become a well-known part of Mississippi's outdoor activities. The first recreational activity to begin in Mississippi for which MDEQ provided seed money is called *The Battle on the Bayou*. This 9.5-mile kayak race began three years ago after this fruitful NPS project began. This year was the third annual MDEQ-sponsored *Battle on the Bayou*. Over 200 participants throughout the United States



traveled to Ocean Springs in order to participate in this *Blueway* event. Continuing the effort of providing recreational paddling trails in Mississippi, other *Blueways* have been added. *The Pascagoula River Blueway* took place at Lighthouse Park in Pascagoula, and *The Jourdan River Blueway* took place at McLeod State Park in Kiln. *The Red Creek Watershed Project* created a beautiful scenic *Blueway* in Stone County thanks to a partnership with the local watershed group. *The Wolf River Watershed Project* also added a *Blueway* component in order to engage local stakeholders and to improve the recreational use of the Wolf River and potentially in other southern Mississippi streams. *Blueway* designations provide for additional opportunities for eco-tourism while fostering stream stewardship. The NPS program will continue to promote the development of additional *Blueways*.



WaterFest Event on the Ross Barnett Reservoir

The Ross Barnett Reservoir WaterFest 2012 was an exciting conservation event held at Lakeshore Park located on the Ross Barnett Reservoir. The event highlighted the need to protect and improve water quality within the Ross Barnett watershed. The event featured fun, educational/interactive activities, exhibits, food, music, demonstration areas, and more. Attendance for 2012 was over 1,900 people. The Reservoir's official mascot, *Mr. Whiskers*, was there along with *Sam E. Soil*, the mascot for the Soil and Water Conservation Districts. Both mascots devoted the entire afternoon

to posing for pictures and handing out literature about protecting and restoring the Reservoir. During *WaterFest*, a kayak race was held through a partnership with the Reservoir Gator Bait Paddler's Association which included nearly 50 kayakers that made either a 3- or 9-mile trek across the reservoir.



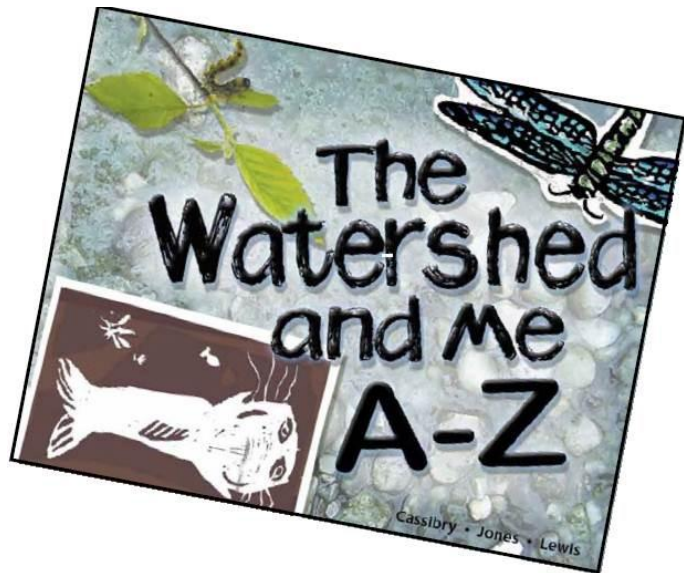
A new addition to the festival this year was *Project Rezway*, a fashion runway contest for children under the age of 18 to construct apparel and accessories out of 75% recycled material.

Watershed Harmony Musical Puppet Theater

MDEQ and Bayou Town Productions completed the first performance of the *Watershed Harmony Musical Puppet Theater* in October 2003. Since that time, performances have reached more than 72,000 students, teachers, and others. During the 2012 tour, over 4,000 people enjoyed the show (data through September 15). Eleven more performances in 2012 are scheduled from September 19th to November 29th. Pre-test/post-test scores revealed a significant increase in knowledge and awareness of water-pollution problems, solutions, and stewardship. The play focuses on the prevention of polluted runoff by promoting the use of best BMPs and individual stewardship to improve water quality. The *Watershed Harmony Musical* conforms to the 4th- and 5th-grade *Mississippi Framework Curriculum* and the *National Science Standards*. The performance is frequently used as a school presentation and as a part of environmental field-day student events. In addition to students, the show is enjoyed and seen by all ages and many groups, including civic clubs, special-event groups, summer reading programs, scout troops, and summer camps. The 30-minute, musical play is performed on a multi-level, 12'x12' stage that conveys a water-quality stewardship theme. The show has received numerous accolades and compliments to include the following quote from a school principal that illustrates its educational impact. *"I was a classroom teacher for 12 years and have been an administrator for 13 years. **Watershed Harmony** is, without a doubt, the best presentation I have witnessed in my 25 years in public/private education! The students were totally engrossed in the performance from start to finish, and actually became actors in one segment, which drew the attention of their classmates..."*

The Watershed and Me A-Z Book

MDEQ, through its Section 319 NPS grant, provided funding for the Mississippi Gulf Coast Community College to produce a book which an "alphabet book" is containing images of plants and animals that are located in the Longleaf Pine Ecological System of Mississippi. This ecosystem extends from the Meridian area of central Mississippi in the upper Pascagoula River Basin to south of Jackson and southward all the way to the Gulf Coast. The book was released in September, 2012 and is focused on the educational concept of "community-based education" or "place-based education." This concept means that you teach students about the ecological system surrounding them so that they will value, conserve, and protect it. MDEQ is also funding workshops to be taught in the schools of the Longleaf Pine region relative to the book. The workshops include a curriculum with related lesson plans and activities that target 3rd, 4th, and 5th grade students and their teachers.



Envirothon Competition

This competition tests student knowledge about water, soils, forestry, wildlife, and current environmental issues. In 2012, there were 359 high school students (56 teams) and their advisors from 31 Mississippi counties who participated in four area competitions. A total of 115 students (23 teams) participated at the state level competition. Oxford High School, being the winning team, traveled to Selinsgrove,



Pennsylvania to compete in the North American Canon Envirothon Competition held in July. Oxford High School placed 16th out of 54 teams in the international competition and had the highest score in the subject of soils. MDEQ assists with sponsorship, Envirothon training, the steering committee, and the statewide competition.

Mississippi Urban Forestry Council “Scenic Communities” Green Infrastructure Initiative

The 2008 grant was used to produce a newly updated resource guide called *Scenic Communities of Mississippi, A Comprehensive Resource Guide for Green Infrastructure, Sustainability, Conservation and Sound Environmental Practices*. This guide is designed for municipal leaders to locate resources related to natural resource management, green infrastructure, sustainable practices, and the natural environment. A “trees and water quality” section was added. Within the Scenic Communities Campaign, the 2008 grant was also used to conduct 269 community-training and education events where a newly designed display featured the *Scenic Community Catalog Resources*.

Make-A-Splash Event

A *Water Education Event* is held each September at the Mississippi Museum of Natural Science in Jackson, Mississippi where students visit 20 different water-related interactive booths to learn about polluted runoff, wildlife, water use, groundwater, surface water, and macroinvertebrates, etc. The 2008 grant was used to fund the annual events held in 2009 and 2011 that were attended by 1,498 students and their teachers. Currently (in 2012), the eleven schools participating had 766 students who attended. The students were from eight schools in the Mississippi Delta (Yazoo River Watershed), two schools in the Pearl River Watershed, and one school in the Bayou Pierre Watershed.

Adopt-A-Stream

Adopt-A-Stream (AAS) is a program funded by §319 and implemented by the Mississippi Wildlife Federation (MWF), in cooperation with MDEQ. This program promotes environmental stewardship by training volunteer citizens about stream ecology, aquatic life, and water chemistry. Volunteers attend a one- or two-day, water-education workshop to learn how to monitor a stream, conduct a stream cleanup, or mark storm drains. In 2012, twenty-four people attended the traditional 2-day workshop and 149 attended nine 1-day workshops.



Over 8,250 people were reached with the AAS Program statewide through ten large-venue environmental events. Three student *Envirothon* high-school training sessions (see details about this above) were held in conjunction with AAS where 47 students attended and 17 aquatic education presentations were made to 1,445 people. The AAS Program coordinator within the MWF also attends meetings and participates in community environmental activities. These may include stream cleanups, litter pick-ups, planting days, and various back-to-school nights where conference displays are shown. A new subgrant agreement using §319 funds will be executed during this new Federal Fiscal Year 2013 allowing the AAS Program to continue for another three years.

Storm Drain Marking Program

The Storm Drain Marking Program is another cooperative program between MDEQ and the MWF. MDEQ provides MWF funding for this through one of its Section 319 subgrant agreements. The program promotes awareness of the water-quality impacts of polluted runoff in urbanized communities. Small plastic disks are placed by local volunteers on storm drains with the message “*No Dumping, Drains to River.*” During 2012, volunteers glued the markers to 252 storm drains and distributed door hangers to homes. Students and scouts also talked with residents about storm- water runoff and the need to prevent pollutants from entering storm drains. A brochure entitled *How to Conduct a Storm Drain Marking Project* can be found at the following web site: [Storm Drain Marking](#)



Enviroscape and Groundwater Models

MDEQ staff reached over 5,000 students, teachers, and the general public in 2012 using presentations associated with water quality. Over 110 water models have been distributed throughout Mississippi to county Mississippi State University Extension Service Offices, Department of Health offices, Soil /Water Conservation Districts, Environmental Learning Centers, the Choctaw Indian Reservation, and other organizations.



Rain Barrel Demonstration Project

A rain barrel connected to a household gutter collects and stores rain water from a rooftop for later use in watering or irrigation. The *Rain Barrel Demonstration Project* was held to educate the public about the ease of constructing and using a rain barrel to reduce runoff into storm drains, rivers, and streams. The project educated and assisted 262 people in building 275 rain barrels as well as producing informational brochures. These informational brochures teach the environmental and economic benefits of using rain barrels as well as providing detailed construction plans for building a household rain barrel. The brochure is available for public use and can be found on the MDEQ web site below.

[Chiwapa Creek Rain Barrel Project](#)



Mississippi and Yazoo River Environmental Tours

A NPS project to educate students about the Mississippi and Yazoo River watersheds began in the fall of 2008. During 2012, a total of 356 students and teachers toured the rivers on a river boat. They viewed land uses on the shore, water uses in the two rivers, and the industrial harbor that might impact water quality in the two watersheds. Pre-test/Post-test scores indicated an increased knowledge and awareness as a result of the tours. Students also gained a new perspective about water quality in their communities.

NPS - Related Programs

Environmental Teacher Workshops and Student Environmental Camps



A total of 1,328 teachers and 3,525 students were reached during 2012 at MDEQ-sponsored training venues. Also, 931 educators attended these venues. Included in the statewide training were 47 approved workshops where teachers could obtain Certified Education Units. Two curricula were used in the training that included *Watershed* and *Me A-Z* and *Longleaf Pine*.

The *Watershed* and *Me A-Z* curriculum is new and was released in September 2012 (see further details below).

Six (6) student Environmental Day-Camp sessions were conducted at two Mississippi

Universities with over 104 students in attendance.

Mississippi Coastal Cleanup

About 2,500 volunteers scoured Mississippi's beaches and waterways on October 20, 2012 picking up marine debris at 68 designated cleanup sites during the *24th Annual Mississippi Coastal Cleanup*, part of the *International Coastal Cleanup*—the world's largest volunteer effort to clean up the marine environment.

During the 2012 *Mississippi Coastal Cleanup*, 2,545 volunteers picked up 2,053 bags of trash, including 164 bags of recyclables along 199 miles of coastal waterways in Hancock, Harrison, and Jackson counties and the barrier islands. The cleanup is organized by the Mississippi Department of Marine Resources and Mississippi Marine Debris Task Force, which includes representatives from about 50 different federal, state, private, and non-profit organizations. The *Mississippi Coastal Cleanup* returned to the beaches and barrier islands and again expanded its reach through its partnership with Mississippi Power's *Renew Our Rivers* program. Participants of this program cleaned two sites on the days leading up to Saturday's cleanup and removed more than 10 tons of debris.

The volunteers collected about 54,640 pounds of debris including 184 tires—that's 27.3 tons of marine debris. This included items too large to fit in trash bags such as household appliances and shopping carts. Fun, odd, and interesting items collected during the cleanup included such things as: an unopened safe in Gautier; a chandelier with bulbs on Petit Bois Island; a kid's rocking horse; and a tiki hut.

Healthy Watershed initiative

The United States Department of Agriculture's National Resource Conservation Service (NRCS) is partnering with 12 states within the Mississippi River Watershed basin to improve water quality within the watershed. Through the partnership, the NRCS has created the *Mississippi River Basin Healthy Watershed Initiative* (MRBI) which will promote the implementation of voluntary conservation practices by landowners, state agencies, and federal agencies that will concentrate practices by containing nutrients rather than controlling them. The initiative will significantly decrease polluted runoff in order to improve water quality within the basin and to control nutrient loading which contributes to the hypoxic zone in the Gulf of Mexico. The watersheds within the Mississippi Delta that have been selected to implement various conservation practices are Deer Creek-Steele Bayou Watershed, Big Sunflower River Watershed, and Upper Yazoo Watersheds. These conservation practices include systems that avoid, control, and trap nutrient runoff to improve the wildlife habitat and help maintain the agricultural productivity within the State.

The Mississippi 319 Waste-Pesticide Disposal Program



Mississippi farmers continue to take advantage of economical ways to address waste-pesticide disposal problems and improve water quality in their watersheds at the same time.

Through a §319 subgrant from MDEQ, two additional waste-pesticide disposal-collection events were planned and held in federal fiscal year 2012. These events were coordinated by the MSU

Extension Service, with assistance from the Bureau of Plant Industry, a division of the Mississippi Department of Agriculture and Commerce.

Since MDEQ's annual report in 2011, two disposal events were held in Greenville and Cowart, Mississippi. A total of 43,662 pounds of waste-pesticide products were brought to the collection sites where the products were collected and properly disposed of by a licensed hazardous-waste contractor. Some 38 farmers from 13 counties participated in the events. These events saved farmers more than \$52,394 in disposal fees that would have incurred in the absence of the program. These results reflect a positive collaboration of farmers, farm-support groups, educational institutions, and environmental agencies.

These programs and prior ones funded by §319 grants have had a positive impact on reducing environmental risks and improving water quality in rural Mississippi while providing farmers an economical way to dispose of waste-pesticide products. Since the inception of the program, more than 1.3 million pounds of waste pesticides have been collected from more than 625 farmers in just about all of

Mississippi.

In addition to reducing potential environmental risks associated with these waste products, the events collectively saved farmers about \$1.357 million in disposal costs. Additional disposal events will hopefully be held in early 2013 with additional funding. These events will be welcomed to further reduce environmental, water-quality, and health-related risks in agricultural areas of Mississippi.

Water-Pollution Control Revolving-Loan Fund

The Water Pollution Control Revolving Loan Fund (WPCRLF) program provides low interest loans to public entities in the State for construction, repair, or replacement of wastewater, storm water, and nonpoint source pollution projects. Funding for these projects comes from federal grants, state match, repayments, and interest on deposits. Since 2010, additional subsidy funding provided through annual Congressional appropriations, has also been made available to "Green" and "Small/Low Income Community" WPCRLF projects. During 2012, MDEQ funded 18 new WPCRLF projects totaling \$40.5 million that included approximately \$7.8 million of Green or Small/Low Income Community subsidies.

Water Pollution Control Emergency Loan Fund

The Water Pollution Control Emergency Loan Fund (WPCELFF) program provides loans to communities for the emergency construction, repair, or replacement of wastewater collection and treatment facilities. The WPCELFF has approximately \$3,108,000 available for such emergency projects. MDEQ encourages communities throughout the State to utilize this program whenever funds for emergency wastewater projects are needed.

The Gulf Region Water and Wastewater Plan

During 2006, the Mississippi Department of Environmental Quality developed the Mississippi Gulf Region Water and Wastewater Plan as directed by Governor Barbour in response to Hurricane Katrina. This plan recommended over \$600 million to fund water and wastewater projects in Pearl River, Stone, Jackson, Harrison, and Hancock Counties to: (1) support existing and future growth patterns, particularly as realized through new housing construction; (2) promote economic development and; (3) emphasize the regional concept for infrastructure management. The funding is provided by the U.S. Department of Housing and Urban Development (HUD) through the Disaster Recovery Community Development Block Grants (CDBG-DR).

Final engineering designs and all clearances for the Environmental Review Records have been completed for all original projects. More than 87% of the nearly 4,000 individual parcels, easements, and right of entries required for the projects have been acquired.

Environmental permits necessary for construction have been issued, including: National Pollutant Discharge Elimination System (NPDES), State of Mississippi Water Pollution Control Operating, MDEQ stormwater, the Corps of Engineers Section 404 wetlands, Section 401 water-quality certifications and MDEQ groundwater withdrawal permits. All original projects have been advertised, received construction bids, and commenced construction. To date, the sub-recipients (county utility authorities) have submitted closeout packages for 21 projects. An additional 30 projects have reached or are expected to reach

substantial completion by 2012 year's end. The remaining projects are expected to finish during calendar year 2013.

The projects being constructed include 17 wastewater treatment facilities, 32 water wells, 32 elevated storage tanks, 68 sewage pumping stations, and more than 600 miles of water and sewer mains (roughly the distance of a round-trip between Biloxi and Memphis).

MDEQ has paid out in excess of \$570 million in program related expenses through the end of 2012. The County Utility Authorities (CUAs) averaged incurring approximately \$7 million per month on construction related expenditures during 2012.

The coming year, 2013, should see a vast majority of the projects and grants closed out, assuming the outstanding rights -of-way and property acquisitions can be obtained in a timely manner. The CUAs are hard at work on start-up activities, as well as continuing to ensure the viability of their facilities, including the construction of ancillary projects that will connect to the CDBG-DR funded facilities. MDEQ anticipates that this program will have a very positive and lasting impact on the lives of coastal residents.

Source Water Assessment Program

The 1996 amendments to the Safe Drinking Water Act mandated states to develop and implement a Source Water Assessment Program (SWAP). The purpose of this program was to notify Public Water Systems (PWS) and customers regarding the relative susceptibility of their drinking-water supplies to contamination. Congress intended for these susceptibility assessments to encourage efforts that would enhance the protection of PWSs by managing identified potential contaminant sources of concern. In 1998, the Mississippi State Department of Health (MSDH) contracted with MDEQ to develop and administer the SWAP in Mississippi. Required elements of assessments include the following: (1) delineating Source Water Protection Areas around PWS wells; (2) inventorying potential contaminant sources in the protection areas; (3) assigning susceptibility rankings to wells and; (4) notifying the public regarding the availability of SWAP information.

Assessments in Mississippi use the following rankings to notify PWSs of their relative susceptibility: (1) Higher, (2) Moderate, and (3) Lower. Most of the public groundwater system wells in the State have received a Moderate ranking (63%), while 29% have received Lower rankings and only 8% have received higher susceptibility rankings. Some of the criteria considered when assigning these rankings to public groundwater systems include aquifer confinement; MSDH minimum well-design criteria; potential contaminant sources identified within the delineated Source Water Protection Area and; abandoned wells within the protection area.

The size of a Source Water Protection Area is based on eight delineation scenarios that were developed using EPA's Wellhead Protection Area (WHPA code) computer program. The different scenarios are a result of countless computer modeling runs and an extensive data review of aquifer characteristics and well data from the USGS and MDEQ's Office of Geology and OLWR. The eight developed delineation scenarios incorporate differing model input parameters, including well discharge, aquifer porosity and transmissivity, aquifer thickness, and time. The approved pumping scenarios are arranged according to well discharge ranges with larger pump rates corresponding to larger Source Water Protection Areas. Assessments of all public groundwater systems and the three public, surface-water systems operating in the State have been completed. After MDEQ mailed the prepared assessment reports to the systems, it became their responsibility to notify their customers that a SWAP report was available for review upon

request. As another reminder, the EPA required the annual Consumer Confidence Report (CCR) prepared by systems to include a reference regarding the SWAP report and a brief summary of the assessment findings.

The SWAP reports and corresponding maps of delineated Source Water Protection Areas are available online at the MDEQ website: [SWAP Resources](#). As a result of recent MDEQ regulatory changes, all new PWS wells now require that preliminary assessments be performed by MDEQ prior to the issuance of groundwater withdrawal permits. These preliminary assessments allow the suitability of proposed well sites to be screened prior to the drilling and completion of PWS wells.

Source Water Protection Strategy

Mississippi's Source Water Protection Strategy for PWS wells using unconfined aquifers involves the integration and coordination of protection efforts with various environmental regulatory programs within MDEQ, such as *UST*, *RCRA*, *CERCLA*, and Brownfields/Uncontrolled Sites, as well as the MSDH. The implementation of this strategy is initiated when the corresponding regulatory programs are provided a Source Water Assessment analysis of a PWS well from the Groundwater Planning Branch. This direct cross-program involvement should help to ensure contaminant plumes do not degrade shallow groundwater sources used for public water supply. The strategy will be considered complete after MDEQ meets with representatives of systems to explain pertinent protection measures.

The protection strategy for public groundwater systems using deeper confined wells focuses on the hydro-geologic confinement (vulnerability) of their production aquifers. Adequate aquifer confinement is generally assumed if an overlying confining unit of clay is at least 30 feet in thickness and/or the corresponding potentiometric surface (head) extends at least 10 feet above the screened aquifer. The implementation of this strategy is considered complete when the confinement is verified and a system is notified of any abandoned (unplugged) wells that may pose public health issues.

The Source Water Protection Strategy for the four surface-water intakes used in the State involves the integration of public drinking-water protection into MDEQ's Basin Management Approach that is designed to protect and restore the quality of Mississippi's surface-water resources. This integration component was well received by the two relative Basin Management Teams that incorporated extra protection measures into their management plans to complete the strategy. EPA Region IV and the Tennessee Valley Authority are assisting MDEQ with these projects. Meetings with these PWS systems have been held and additional meetings to discuss protection measures are intended. The State is also participating in a national pilot project to address the integration of the SDWA and the CWA.

Storm Water Program

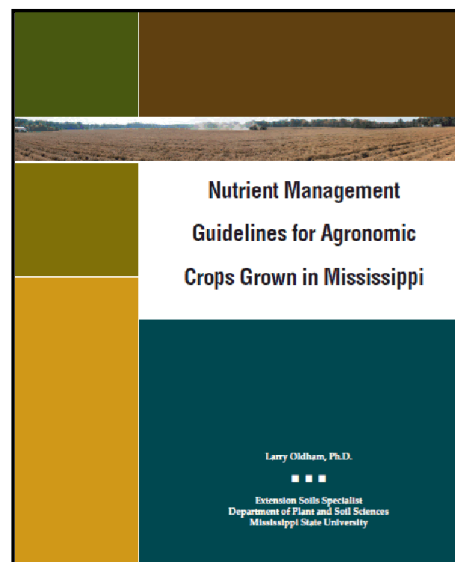
Implementation of Mississippi's Storm Water General Permits and regulations continued in Fiscal Year 2012.

- The Environmental Permits Division (EPD) issued general permit coverage for 183 large construction projects (five acres or greater). In addition, 43 construction projects were recovered under the current general permit and 42 projects issued modifications.
- EPD issued general permit coverage for 55 regulated industrial facilities under the Baseline Storm Water General Permit for Industrial Activities.
- EPD received and processed 71 "No Exposure Certifications" from potentially regulated industrial facilities. Facilities that certify "no exposure" of industrial activity to storm water are not required to obtain storm-water coverage under the Baseline General Permit.
- EPD reissued the *Mining Storm Water, Dewatering, and No Discharge General Permit* on September 7, 2012. EPD has issued recovery certificates to 70 projects to date. These are projects that have ongoing mining activities when the previous permit expired and therefore must be covered under the current general permit. In addition, EPD issued new general permit coverage for 67 surface mining operations (clay, gravel, sand, etc.).
- EPD reissued the City of Jackson's Storm Water Permit on August 29, 2012.

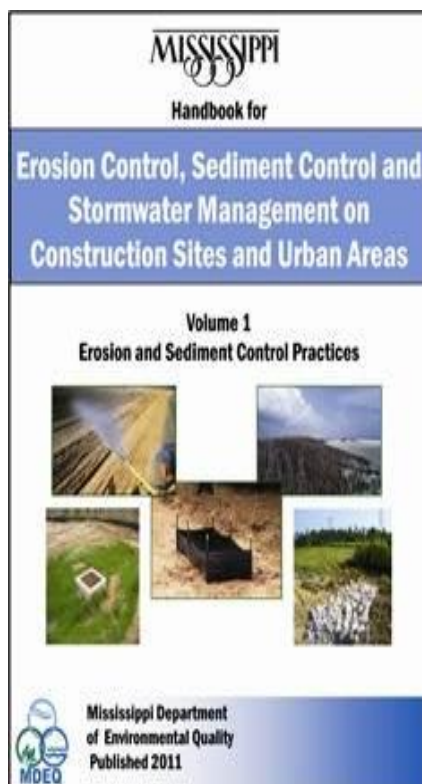
Videos and Manuals:

Nutrient Management Guidelines for Agronomic Crops Grown in Mississippi – MDEQ, through its NPS grant, funded the Department of Plant and Soil Sciences, Mississippi State University, for the development of a nutrient management planning manual to be primarily used by farmers who grow crops. The publication was completed in March of this year and it brings together many years of science regarding the economic and environmentally responsible use of plant nutrients in Mississippi. This manual was selected as the national winner of the bound book category in the Communications Awards program of the National Association of Country Agricultural Agents. This manual should go a long way in reaching a goal to maximize plant productivity while minimizing environmental consequences. The internet link for accessing this document is:

[Nutrient Management Guidelines for Agronomic Crops Grown in Mississippi](#)



Updated Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas



Construction areas and commercial developments often require innovative application of art and science to help insure that people are held safe, property is protected, and the environment is not adversely affected. To help with this management task, MDEQ collaboratively developed a document entitled *Planning & Design Manual for the Control of Erosion, Sediment and Stormwater* (hereafter called the Manual). The first edition of the Manual was implemented in April 1994, and it has served as a guidance document for mitigating stormwater and sediment management issues since that time. However, EPA is expanding the promulgation of stormwater regulations throughout the country. As a result, more municipalities in the State are falling under the requirements for adequate stormwater planning and a greater range of construction and development activities must be managed under the regulatory authority of MDEQ. There have been substantial advances in the state-of-the-art in runoff management and environmental protection related to erosion mitigation and stormwater pollution. As a result, MDEQ recently elected to initiate a process of review and improvement of the current Manual, with significant input from MDOT and USDA. In 2012, the Manual has been presented at four, statewide conference-events that included audience members of private contractors and engineering professionals, as well as state and federal agency personnel. The updated Manual is available for public use, please follow this link: [Erosion Control Manual](#)

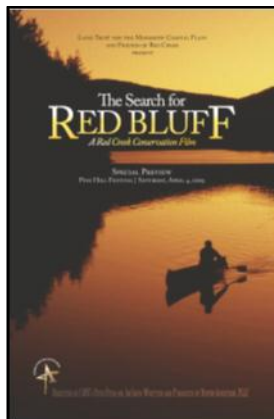
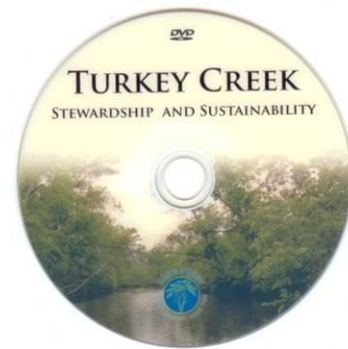


Reigning over Runoff video is a production of the Natural Resources Initiative of Mississippi. This short film, in a compelling way, focuses on a few practices that homeowners and communities can use to enhance water quality. Noteworthy are scenes from selected streams, rivers, wildflowers, and more; the reader can view this film by going to the following web-site:

[Reigning over Runoff](#)

The ***Turkey Creek Video*** project began in January 2009 and has been widely distributed to stakeholders and community members. The Turkey Creek Watershed is located in Harrison County near the Mississippi Gulf Coast, north of Gulfport. It is predominantly an African-American community.

[Turkey Creek Video](#)

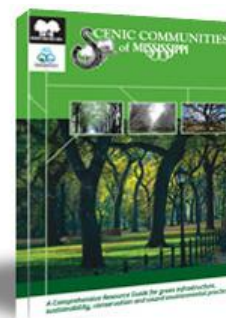


Red Creek Video - an entertaining documentary film entitled “***The Search for Red Bluff***” was produced and widely distributed. This film includes a rich historical narrative of the watershed and describes the potential outcome of poor management of our natural resources and lack of proper BMP implementation.

[Red Creek Video](#)

Scenic Communities Resource Guide Catalog – a Comprehensive Resource Guide for Green Infrastructure, Sustainability, Conservation and Sound Environmental Practices. Completed in 2011 by the Mississippi Urban Forestry Council with partial funding from the MDEQ Nonpoint Source Pollution Program, the Catalog may be used by county and municipal governments to locate grants, state revolving loans, NPS experts, and materials to improve the quality of life in their communities.

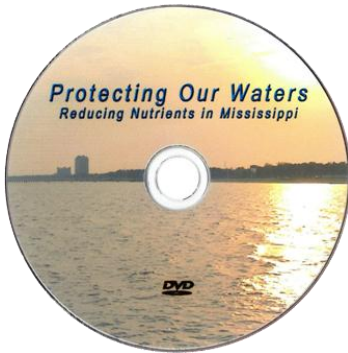
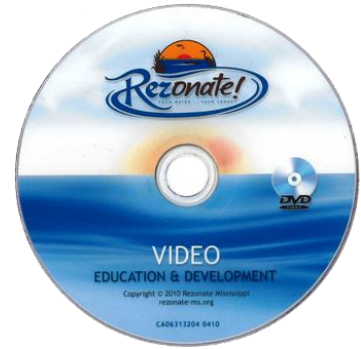
[Scenic Communities](#)



Scenic Communities of Mississippi

Ross Barnett Reservoir Initiative, Rezonate - As part of the *Rezonate* project, MDEQ developed an education and development video that contains footage depicting Ross Barnett Reservoir's ecosystem, urban development, parks, and recreation. The video was created in 2010 to help aid in the preservation, protection, and water-quality improvement throughout the Ross Barnett Reservoir area.

[Rezonate!](#)



Protecting Our Waters...Reducing Nutrients in Mississippi -

This is a video that was developed to tell Mississippi's nutrient reduction story. It premiered at the first Mississippi Nutrient/Hypoxia Summit held on October 1, 2010.

[Protecting Our Waters Video](#)

Bee Lake Watershed Success Story- Available on MDEQ Website: [Bee Lake Video](#)





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